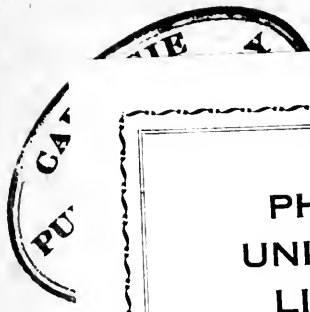


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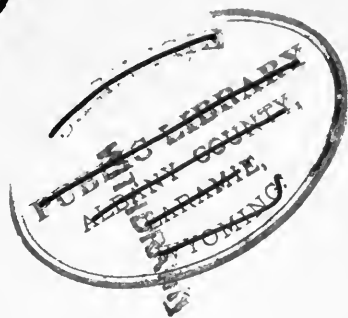
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VOLUME XXIV

NUMBER 1

The American City

NEW YORK
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Organizations Plan for Needed Legislation to Promote Municipal Progress

DURING January the legislatures of forty states will be in session and there will be exceptional opportunity for the introduction and passage of state legislation which the cities need. Many national, state and local organizations are advancing the passage of bills which, if enacted into law, will do much to permit or encourage activity by municipal governments in raising the standards of city life.

Greater Freedom for Cities

In many states the greatest single need is a larger measure of municipal home rule. At the last annual convention of the New Jersey League of Municipalities this need was emphasized by Clinton Rogers Woodruff in the following words:

"We talk of self-governing American cities and municipal democracy, but so long as the state legislatures have the final say as to the form and content of city charters, there can be little real self-government or real municipal democracy. Most of our cities—except in those states where the policy of municipal home rule prevails—are in bondage to the state legislatures. The term and extent of this bondage vary, but it is irksome and undermining. While we must remember that no city lives unto itself alone, nevertheless it should be given a chance to show what it can do and how it can be developed. There is an all too prevalent feeling that the cities should be saved despite themselves by some outside influence, but just so long as this opinion prevails, so long will municipal politics continue in their present parlous state, and so

long will the progress of our cities proceed haltingly.

"A belief in municipal home rule does not necessarily run counter to the idea of the right of the state to establish the minimums in such matters as education, health and police. On the other hand, the cities should have the right to go just so far beyond these minimums as their wishes and convictions demand. The test of the propriety or impropriety of any given insistence or interference or control by the state in the local public policy of a city should be: Does the local policy conflict with the general public policy of the state, as determined by the policy-determining authority of the state and which, as such general policy, is embodied in laws equally applicable to every part of the state? By all means give the cities a chance to determine the form of government and to determine the functions they wish to exercise."

Among the reports received from organizations which have written to THE AMERICAN CITY regarding their activities in behalf of 1921 legislation are the following. In each case the name given is that of the corresponding secretary or other officer of the organization, to whom application may be made for further specific information.

The *National Conference on City Planning* advocates at all times (1) a state law empowering cities of all classes to appoint city plan commissions, and (2) a state law permitting cities to zone. Besides these two laws there is little doubt that the National Conference would advocate a state planning bureau like that in Pennsylvania, and

would approve in legislation the principle of regional planning. Although it is perhaps questionable if any existing laws on the subject could be described as "model" legislation, some might be profitably used as the basis of statutes in other states. This is particularly true of the Ohio law permitting the appointment of city plan commissions and describing their functions.—Flavel Shurtleff, Secretary, 60 State Street, Boston, Mass.

The *Boston Society of Landscape Architects* is not at present proposing to introduce any legislation, but it has before it two recommendations of its city planning committee: (1) that better means of preventing bad platting be discovered; (2) that the principle be approved of a metropolitan commission for the Boston Region for planning and survey, transportation, waterfront development, and such other administrative functions as concern more than one municipality.

The B. S. L. A. coöperated last year with the Massachusetts Federation of Planning Boards and other bodies in securing: (1) the right for municipalities to zone according to use, making effective a Massachusetts constitutional amendment of November, 1918; (2) the regulation of billboards, making effective another constitutional amendment of November, 1918, providing a state-wide regulation by the State Division of Highways and permitting further regulation by any municipality.—Arthur C. Comey, Landscape Architect, Abbott Building, Harvard Square, Cambridge, Mass.

The *National Association of Real Estate Boards* has placed itself on record as favoring city planning, and also state regulation of real estate brokerage. Four states now have effective legislation of that sort. A Model License Bill has been adopted and is recommended by the National Association, in the hope that such regulation will do much to protect the ignorant or uninformed purchaser of real property. The real estate boards of various cities have been active in securing legislation. For instance, the Chicago Real Estate Board has aided in the zoning movement in that city; the Minneapolis Real Estate Board, through a special committee, was instrumental in securing legislation for a housing code in that city, and another bill which provided for zoning.—Tom S. Ingersoll, Secretary, 630 Consumers Building, Chicago, Ill.

The *National Short Ballot Organization* does not specifically advocate legislation in any state or city. It is, however, furnishing assistance to local organizations along the following lines:

State administrative consolidation: Constitutional amendments pending in New York and Indiana to simplify the structure of state government and to remove minor elective offices from the ballot; campaign to interest other legislatures in what is being done in New York, Illinois, Idaho, Nebraska and Massachusetts along these lines.

County government reform: Gathering and reissuing all available literature on the neglected subject of county government, looking toward the county-manager idea. The principal campaign will be in Michigan and in several cities, including New York, where city-county consolidation is in prospect.

City manager charters: This campaign has been transferred to the National Municipal League. Aid will be given in efforts to secure state-wide optional city-manager laws in New Jersey, Indiana and Illinois along the lines of the twelve state-wide city-manager laws now in operation. Technical and publicity aid will be given to city charter commissions and campaign committees wherever charter revision is proposed.—Richard S. Childs, 8 West 9th Street, New York City.

During the last year the *American Public Health Association* has not been active in promulgating state or local legislation. However, a committee of the Association is at work on a Model Health Code, and a report is expected within the next half-year.—A. W. Hedrich, Secretary, 169 Massachusetts Avenue, Boston, 17, Mass.

The *National Fire Prevention Association* writes that the only state legislation it is advocating is an enabling act permitting cities to fix on persons disobeying fire prevention orders the costs of extinguishing preventable fires. In some states, cities can already do this without state legislative permission. The Association will present before the Massachusetts Legislature a copy of the law now in force in Pennsylvania cities of the second class. It is hoped that legislation of this sort may become general throughout the country as the people awaken to an appreciation of the economic significance of the fire waste.—Franklin H. Wentworth, Secretary, 87 Milk

Street, Boston, Mass.

The *National Physical Education Service of the Playground and Recreation Association of America* has been very successful in assisting states in adopting physical education laws. Such legislation has already been passed in Alabama, Georgia, Indiana, Kentucky, Maine, Michigan, Mississippi, Oregon, Pennsylvania, Utah, Virginia and Washington. The campaign will be pushed in other states. The general program includes the provision of a state director of adequate training and experience to assist local communities in the establishment of physical education programs; provision for the instruction of all prospective teachers in the general course of physical education; provision that local authorities be required to provide adequate physical education for all children within their districts; and state appropriations to aid local communities in the employment of physical education teachers. The Service is also a firm advocate of periodic physical examinations of all children.—E. Dana Caulkins, Manager, 309 Homer Building, 13th and F Streets, Washington, D. C.

The *National Kindergarten Association* is actively pressing a campaign in about one-half of the states of the Union, either by its direct efforts, or by assisting other organizations sponsoring local legislation. The California kindergarten law of 1913 is used as a model. This law provides that the Board of Education in each school district may maintain free kindergartens; that the establishment of such a kindergarten is mandatory upon the presentation of a petition signed by the parents of not less than 25 children of kindergarten age residing in the area to be served; and that teachers for such kindergartens must have had at least two years' training in a recognized kindergarten training school. The Association proposed an amendment to the law, namely, that if the average monthly attendance for two succeeding months drops below fifteen, the class may be discontinued for the remainder of the year. Full legislative information, as well as the names of the organizations sponsoring this legislation in the several states, may be obtained from Miss Bessie Locke, Corresponding Secretary, 8 West 40th Street, New York, N. Y.*

The *National Civil Service Reform League*, although not at this time undertaking any special campaign, is recommending the adoption of civil service laws for states and cities throughout the country. During the past year the League has secured the adoption of a civil service law in Maryland and a civil service provision in the Baltimore charter. H. W. Marsh, Secretary, 8 West 40th Street, New York City.

The *National Safety Council* is not now advocating any specific legislation. It is very much interested in proper traffic regulation in cities to prevent automobile accidents, which are increasing at a rapid rate. As the proper handling of traffic is intimately bound up with city planning, the Council strongly favors legislation which will give cities the necessary authority to carry out city planning on a proper basis, in order to provide, among other things, a traffic system which will minimize the present very serious hazard to life and limb.—S. J. Williams, Secretary, 168 North Michigan Avenue, Chicago, Ill.

The Illinois State Legislature at the coming session will take up a number of questions of concern to the municipalities of that state. Among them will be that of municipal home rule for public utilities, with the possibility of abolishing the State Public Utilities Commission. Another question that will come up will be that of continuing the increased tax rates which were authorized two years ago, for a term of three years. The Housing Commission will present a bill regulating the construction of dwelling houses, and probably also a bill for the regulation of rents. The *Illinois Municipal League* has taken no position on these proposals.—John A. Fairlie, Secretary-Treasurer, Urbana, Ill.

As an example of the reforming energy of the women's club movement, reference may be made to the program of the *Legislative Council of Indiana Women*. Two bills will be promoted, one providing for the employment of a full-time health officer for counties and for cities, instead of the present system, under which a practicing physician devotes only part of his time; and the other a School Attendance Law, for compulsory education to the age of fourteen, or until the eighth grade in school is completed.—Mrs. Edward Franklin White, President, 5222 East Michigan Avenue, Indianapolis, Ind.

* EDITORIAL NOTE.—An article on the subject of the urgent need of public kindergartens, by Miss Bessie Locke, will appear in an early issue of THE AMERICAN CITY.

Sacramento's New Charter

Proportional Representation and the City Manager Plan Adopted by the
Capital of California

By Irvin Engler

Assistant Secretary, Consolidated Chamber of Commerce of Sacramento

SACRAMENTO, the capital of California, leaped into civic prominence on November 30. On that day by a vote of more than 5 to 1—the exact totals were 7,962 to 1,587—the voters of Sacramento adopted a new charter which gives the city the distinction of being (1) the largest city in the United States having the Hare proportional representation voting system; (2) the largest city in California having the city manager form of government; (3) the second and largest capital city in the United States to adopt the manager plan, the other being Phoenix, Ariz.

Moreover, the general claim advanced for the new document is that it more nearly parallels the "Model City Charter" than does any other charter in the nation.

Of course, the one feature that will be most closely watched by other municipalities and students of municipal government will be Sacramento's experience with the Hare proportional representation voting system. Sacramento was the fourth city in the United States to adopt the Hare system. One of these—Kalamazoo—was forced to surrender it because of a Supreme Court decision, leaving Sacramento to share the distinction with Ashtabula, Ohio, and Boulder, Colo. Sacramento is by far the largest of these cities, having a population of 66,000 and a registration of 30,500 voters. The council is to be elected in May, 1921, and that election will give proportional representation the "acid test" in the United States.

Meeting the Opposition

The new charter was adopted by an overwhelming vote in the face of strong opposition directed against proportional representation. One of the newspapers opened a bitter attack on the Hare system fifteen days before the election, and kept up a constant fire. It published articles written by the editors of the *Boulder Camera*, the *Kalamazoo Gazette*, and the *Ashtabula Star-Beacon*, an editor in New Westminster, and one in Nelson, British Columbia; it

quoted a resident of Ashtabula and printed an article written by a former councilman of that city; it claimed that the city managers of Ashtabula and Boulder are opposed to proportional representation, and sent a correspondent to Ashtabula to "size up" the situation there. This constituted the evidence presented against the Hare system.

The other two Sacramento dailies strongly supported proportional representation and the entire charter. The Sacramento Chamber of Commerce, which sponsored the new charter movement, had gathered a mass of favorable evidence, including the stand of the Ashtabula Chamber of Commerce, the opinions of E. O. Heinrich, former manager of Boulder, and A. A. Parkhurst, the editor of the other Boulder daily; also the attitude of Harry H. Freeman, City Manager of Kalamazoo, and, of course, the reports of the American Proportional Representation League, as well as the stand taken by the National Municipal League. This defense was reinforced by the services of Cameron H. King, deputy registrar of voters of San Francisco, who conducted two demonstrations of the Hare system and converted hundreds to the idea that proportional representation was eminently fair and just.

How did the movement start? Why did Sacramento shake off its old charter by such a sweeping decision? In 1911 Sacramento adopted the commission form of government, which became effective in the spring of 1912. Almost from the start there was objection to the commission form. The defects of the system, as pointed out in so many instances, were very apparent in Sacramento. Division of authority and responsibility, election of men unqualified by training or experience to executive positions, and extravagance in city affairs, were resented.

Investigation of Facts

Harry S. Maddox, who was Secretary of the Chamber of Commerce of Sacramento,

kept a steady finger on the public pulse and diagnosed Sacramento's case nearly a year before it became recognized as serious. He prescribed the manager plan as the remedy, and began a thorough investigation, including a personal visit to cities in the East and West operating under the manager system, and collection of data from every city-manager community, large and small. Part of the valuable data collected are given in this issue of *The American City*. (See page 6.)

Just about a year ago the drive was launched. Securing of signatures for the election of Freeholders was a matter of only a few days. The Freeholders were representative of all interests in the city—business, commercial, labor, women's organizations, manufacturers—and although not pledged in advance to the city manager idea, practically decided upon that form of government at their first meeting. L. C. Hunter, manager of a large wholesale concern, was chosen chairman of the Board. Hundreds of charters and a mass of data were collected and gone over carefully by the Freeholders, who labored four months without pay, hoping only to give Sacramento the kind of government that would satisfy the demands of the people.

In any event, the decision was overwhelming, ranging from 3 to 1 in some precincts to as high as 23 to 1 in others, favoring the new charter and rejecting proposed amendments to the old charter. It was the most emphatic approval ever given a municipal proposition in Sacramento's history.

In passing, another point which developed during the campaign, is of more than local interest. The opinions of two attorneys were published by the opposing paper, declaring proportional representation would be unconstitutional in California, as it was declared in Michigan. Ten other attorneys, however, held that the Hare system would not conflict in any way with the California constitution. It is likely that this will be determined in the courts, through a friendly procedure, before the first council is elected.

Provisions of the New Charter

Under the new Sacramento charter the only elected officials will be the council of nine. The council is to appoint the manager, civil service board, attorney, police judge, clerk, treasurer and board of education. The

board of education appoints the school superintendent. The city manager appoints all the administrative officials of the city, his principal appointees being the controller and engineer.

The councilmen will each receive \$300 a year, and as all city manager charters provide, will handle matters of policy only. The board of education is to consist of five members, not more than three of whom shall be of the same sex, to serve without pay.

The engineer is to have charge of all operative work which at present comes under the commissioner of streets and commissioner of public works, while the controller, in addition to keeping the city books, will be in control of all finances, will have charge of assessment and collection of taxes and purchase of supplies. The charter permits the council to use the county assessment rolls for city assessments and also to have the county tax collector collect city taxes, making allowances to the county offices for such service. Greater efficiency and a very substantial saving to taxpayers are looked for through this arrangement.

Provision for development of the city water-front and water-works is a valuable feature, and another is the article enabling the city manager, through the departments of the engineer and controller, and with the consent of the council, to proceed with city contract work when bids are deemed excessive.

Such provisions as have proved beneficial have been taken over by the new charter from the old, others were improved upon, and still others were inspired by the National Municipal League's "Model Charter." The result is a document which should not only prove a splendid governing instrument for Sacramento, but should be of value to other municipalities struggling for better government.

The first council is to be elected on May 3, 1921. The manager is to be appointed by June 30, and the new charter will go into operation on July 1, 1921.

The movement for better government has spread throughout Sacramento County, and a campaign is being launched for a new county charter providing for a county manager. It is even predicted that at a not far distant date there will be strong sentiment for consolidated city and county government with a manager at the head.

Is the City Manager Plan a Success?

The Question Is Answered in the Following Excerpts from Letters Received by the Sacramento Chamber of Commerce from Cities Where the Plan is in Operation

EDITORIAL NOTE.—The italics are those of the Sacramento Chamber.

TO secure first-hand information on the practicability of the city manager form of government, the Sacramento Chamber of Commerce made inquiry of chambers of commerce, newspaper editors and individual citizens in a number of cities where the plan is in operation. Such letters were not addressed to city managers or other city officials, for an absolutely unprejudiced opinion was sought.

It is a very significant fact that in the letters of response there was a *sweeping expression in favor of the city manager plan*. In not a single instance was it declared that the plan is a failure. On the contrary, as shown by the following, there were many very enthusiastic endorsements of the method.

It is thus shown that there is nothing wildly theoretical in the city manager plan—it *actually works, and it works to the advantage of all the citizens*. This, after all, is the greatest essential of good government.

Other letters were sent to cities having the commission form of government, such as Sacramento had, and a large majority of the answers voiced dissatisfaction and complaint, a number stating that there was strong sentiment for the city manager form.

Cities of Over 100,000 Population

The success of the city manager plan in Dayton, Ohio, population 153,830, one of the pioneer cities in the movement, is so generally recognized and admitted that it was not considered necessary to secure additional proof. It was in large part due to the remarkable results attained in Dayton that the city manager plan spread so rapidly in Ohio and in the neighboring states of Michigan and Virginia from 1914 to 1916.

The question is sometimes raised that certain conditions in Dayton were responsible for the great success of the city manager plan in that city and that the plan might not work as well elsewhere. This question is best answered by the following expressions from other cities.

During the last six years 166 cities in 25

states have adopted city manager government, 108 having regular city manager charters and 58 having the method in a more or less modified form. In 1919, 23 cities took it up, and already this year there have been 5 additions to the list. The total number of city manager cities is now 208.

The following expressions show how it is working out:

AKRON, OHIO (208,435)

G. P. Jones, editor.—“Remarkable results have been secured in Akron since the establishment of the city manager form of government on January 1, 1920. In this short time definite results, showing the value of centralized administrative power in the hands of an expert, have been achieved.”

GRAND RAPIDS, MICH. (137,634)

Arthur W. Stace, editor.—“The city manager plan in Grand Rapids has worked out more successfully than the old plan. It has resulted in economy in city affairs with increased efficiency, and the people appear to feel satisfied that it is a great improvement.”

Lee H. Bierce, Secretary, Chamber of Commerce.—“We like the city manager plan because it permits of greater efficiency. The affairs of the city are now being conducted very much like a large manufacturing institution would be managed. There is only one element that is disgruntled with the new form of government. It is composed of some petty politicians of small caliber who used to run the city but are not considered big enough to do so at the present time.”

NORFOLK, VA. (115,777)

Barton Myers, President, Chamber of Commerce.—“The city manager form of government has completely transformed conditions in Norfolk. Its superior efficiency is so generally recognized that under no circumstances would we return to the former system.”

W. G. Swartz, business man.—“Wonders have been worked in Norfolk since the city manager form of government was inaugurated. Politics have been entirely eliminated from city affairs. Red tape has been abolished, as power and authority have been concentrated under one head. More public improvements are under way at the present time than were undertaken in any ten-year period previously. The city manager plan has the entire enthusiastic support of the people of this city.”

Cities of Between 50,000 and 100,000 Population

NIAGARA FALLS, N. Y. (50,760)

George W. Knox, attorney.—“The general sentiment of the people of Niagara Falls seems to be that the city manager plan is a huge success compared to the old conditions. Efficiency has been greatly increased. When we spend a dollar, we get a dollar's worth in return. Under the old system our tax rate put us pretty well to the top of the column of municipalities in this state. Under the new system there are only two cities with a lower tax rate. These things have been brought about despite the election of men to the council who were opposed to the city manager plan. Our experience shows that the plan works to the advantage of the people even though men are elected to the council who are not in sympathy with it. This is because responsibility is directly placed, and there can be no ‘passing the buck’ because there is no one to pass it to.”

ROANOKE, VA. (50,842)

Secretary, Chamber of Commerce.—“The city manager plan has been effective in Roanoke for a comparatively short time, but *thus far has been highly successful*. We feel that the change was justified and that time will show its wisdom.”

SPRINGFIELD, OHIO (60,840)

H. S. Kissell, real estate man.—“*The city manager plan has awakened in Springfield a civic pride such as we never knew before. The humblest citizen feels he can get a square deal with our city officials.*”

George S. Shaw, business man.—“When the city manager form of government was first introduced to the voters of Springfield I was against it, but after several years' trial I am a booster for it. We are now getting 100 cents for every dollar spent, and have had more street improvements, more gas, electric light, water and street car extensions during the last two and a half years than we could have expected during the next ten years under the old form of government. *This is because graft has been eliminated; because the various departments are 100 per cent efficient, and because the entire city is being run like an up-to-date business house.* I believe it to be the only successful form of government for any city, regardless of size.”

R. W. McKinney, Principal, Wittenberg Academy.—“The city manager plan has given Springfield *more for the taxes paid than ever before.*”

WHEELING, W. VA. (54,322)

H. P. Corcoran, Manager, Chamber of Commerce.—“The city manager plan has been successful in every way in Wheeling. It has met expectations and is giving efficient government.”

WICHITA, KANS. (72,128)

W. E. Holmes, Secretary, Board of Commerce.—“Wichita has now had about three years' experience under the city manager form of government. *The plan has eliminated politics from the city government; has developed greater efficiency in service; is more economical as to administration; affords an opportunity for more wholesome, healthy and moral social conditions, and is much more responsive to the wants of the people.* It is an ideal business form of government, as it carries out all the sound, well-established principles that govern private business.”

Cities of Between 20,000 and 50,000 Population

ALAMEDA, CALIF. (28,806)

E. C. Soules, Secretary, Chamber of Commerce.—“The city manager form of government has proved a distinct success in Alameda, and is so considered by a large majority of citizens. *It is a big factor in the development of the city, lending efficiency, economy and prompt action to all municipal undertakings.*”

A. F. St. Sure, Judge of Superior Court.—“The city manager plan of government has proven sound in practice in Alameda. *By avoiding amateur executives and clearly fixing the responsibility for executive acts, the business of the city has been transacted with economy, dispatch and efficiency.* We have one government, and not many, with an experienced expert at the head, who has been given the power to execute the policy established by the combined judgment of the council. Although executive functions have been centralized, ‘one-man power’ has not resulted, for the control of the council over the tenure of the manager removes this danger. *It is safe to predict that the city of Alameda will never return to the old form of municipal government.*”

A. D. Oliver, banker.—“Some of the noticeable improvements that have come to my attention since the establishment of the city manager form of government have been: pronounced improvement of the streets; cleaning up of vacant lots; uniform trimming of shade trees, etc. Where a decided improvement is apparent in the matters that are most easily discernible, it is logical to assume that there is improvement in other directions. *With a competent city manager, familiar with all details, it is much easier to induce representative citizens to take an interest in the city's affairs by serving on the various boards.* I believe that the general opinion in Alameda is that the change has been entirely successful, resulting in economy and great efficiency.”

ASHTABULA, OHIO (22,082)

H. W. Luethi, Manager, Chamber of Commerce.—“We believe the city manager plan is in line with the idea of modern business, in centralizing responsibility and thereby securing the most efficient service. *It has produced splendid results in Ashtabula, has brought about more efficient government, and the people are well pleased with it.*”

BEAUMONT, TEX. (40,442)

George J. Roark, Manager, Chamber of Commerce.—“We have recently established the city manager form in Beaumont. Of course we have not had full opportunity to test the plan locally, but everyone is looking forward with much enthusiasm and worlds of hope, and there is no doubt but what it will prove all that we expect.”

CHARLESTON, W. VA. (39,608)

S. P. Puffer, Managing Director, Chamber of Commerce.—“Charleston is well satisfied with the city manager plan.”

EAST CLEVELAND, OHIO (27,292)

R. C. Morris, Secretary, Chamber of Commerce.—“The city manager form of government is proving very efficient in East Cleveland. Compared with the previous system, there is a very noticeable difference for the better.”

JACKSON, MICH. (48,374)

C. F. Holland, Secretary, Chamber of Commerce.—“From Jackson's experience, we give the following as some of the advantages of the city manager plan: *centralized responsibility; quicker action on projects; a greater equality among all classes of citizens as regards civic affairs, that is, elimination of the so-called 'pull'; elimination of politics from city affairs.*”

KALAMAZOO, MICH. (48,858)

Ray O. Brundage, Secretary, Chamber of Commerce.—“The city manager form of government is much of an improvement over the previous form. We consider it a success.”

MUSKEGON, MICH. (36,570)

T. A. McCarthy, Secretary, Chamber of Commerce.—“The city manager plan is a big step forward in municipal government, and should the people of Sacramento adopt it, their only regret will be that they did not inaugurate it long ago. *The city manager method makes municipal government just exactly what it should be—good business.* The one outstanding advantage is that it centralizes authority and, at the same time, it fixes definitely the responsibility for carrying out the people's wishes. *It does away with the favorite pastime under other forms of government, namely, 'passing the buck.'* We of Muskegon feel that under the city manager plan the affairs of the city are conducted in a businesslike way and that the various departments of the city are conducted upon well-accepted business principles, with the result that we get full value for the money spent.”

NEWBURGH, N. Y. (30,272)

Frederick H. Keefe, publisher.—“The city manager form of government has been in operation in Newburgh for more than four years and has in every way demonstrated that it is a *very efficient and up-to-date plan of administration of city affairs.* It has resulted in very economical administration without in any way impairing efficiency. I feel sure that if it were again to be put to a vote of the people they would unhesitatingly be in favor of a continuation of it.”

PHOENIX, ARIZ. (29,053)

C. H. Akers, publisher.—“I am sure that you could not get a business man in Phoenix to go back to the old style of government. Our city manager seems to be the most popular man in this whole town, simply because the *method, as used by the Commission and the Manager, is working out with splendid, good results.*”

SANDUSKY, OHIO (22,897)

Portion of editorial in recent issue of the *Star-Journal*.—“To make both ends meet in these days when prices and wages have soared and income has not increased proportionately, is no small task. Yet this is what has been accomplished by City Manager

Zimmerman. Despite the reduction of revenue, the chief item of loss being about \$21,000 of liquor tax, the city has taken care of all operation and maintenance charges and sinking fund charges and had a surplus of more than \$4,000 on hand at the end of the year. . . . We have been fortunate. We have been able to live within our means, thanks to efficient and far-seeing management that made every dollar count. For this, *credit is due not only to the Commission, the Manager and other officials, but to the system, with its elimination of politics and coordination of departments.*"

SAN JOSE, CALIF. (39,604)

Roscoe D. Wyatt, Secretary, Chamber of Commerce.—"I think it can be truthfully said that the city manager system in our city has largely eliminated city politics and the various evils that accompanied the old form of government; it has coordinated the various city departments, making them all more efficient; it has placed responsibility upon one person—the city manager—so that every taxpayer may know just where to go for information or to make complaints. The great majority of our citizens are satisfied that the new form of government, which has now been in operation for more than three years, is a very decided improvement over the old."

WATERTOWN, N. Y. (31,263)

Ralph S. Baker, Secretary, Chamber of Commerce.—"Although our city manager form has been in effect for a comparatively short time, it has given every promise of being a tremendous success. Thus far we are well satisfied with the results."

Cities of Under 20,000 Population

ALBUQUERQUE, N. MEX. (15,157)

H. B. Watkins, Secretary, Chamber of Commerce.—"The city manager form of government has been entirely satisfactory in every way, and the people would not consider going back to the old form."

AMARILLO, TEX. (15,494)

W. B. Estes, Secretary, Board of Development.—"No city would make a mistake by adopting the city manager form of government. It has been a great success in Amarillo."

AUBURN, ME. (16,985)

George C. Wing, attorney.—"The city manager plan divorces the business of a city from politics. I think the taxpayers get more for their money. I believe the majority opinion in Auburn is in its favor, and particularly a very large majority of those who in the main pay the bills."

BAKERSFIELD, CALIF. (18,638)

C. F. Johnson, Secretary, Chamber of Commerce.—"The city manager plan has been an unqualified success in Bakersfield. It has resulted in more efficient government, with economy in city affairs, and I do not think that the people would for a moment consider going back to the old order of city government."

BOULDER, COLO. (10,989)

Frank E. Eckel, Secretary, Commercial Association.—"Boulder has found the city manager plan very successful, resulting in very efficient city government."

BRISTOL, VA. (6,720)

W. H. Rouse, business man.—"The work of the city in connection with administration has been considerably expedited under the city manager plan. It is a happy and satisfying division of legislative and administrative duties as compared with the old system of committee government and a general jumble and confusion of duties. I feel confident that under the city manager plan the various functions of any city will be handled with greater efficiency and will respond to the wishes of the people with greater despatch than is possible under other forms."

BROWNSVILLE, TEX. (11,791)

Secretary, Chamber of Commerce.—"The city manager plan has operated with much success in Brownsville."

CADILLAC, MICH. (9,734)

Perry F. Powers, editor.—"I am sure that the people of our city regard with almost unanimous favor our present city manager form of government. *It is more economical, results come quickly, responsibility is fixed, and it soon gets the business affairs of a city away from politics.*"

CRYSTAL FALLS, MICH. (3,394)

W. J. Reynolds, County Treasurer.—"Crystal Falls has been under the city manager plan for about three years. Before the institution of this form of government we suffered an unwieldy council to manage our affairs under an unbusinesslike arrangement that excluded any possible chance of improvement. *Since the institution of the new form of government, the results have been astounding. I do not believe there is a resident of the city who is not satisfied with the new form of government.*"

EL DORADO, KANS. (10,995)

Russell Fisher, Secretary, Chamber of Commerce.—"The city manager form of government is regarded as a decided success in El Dorado. Efficiency has developed because the plan has centralized responsibility. This city led the United States in percentage growth during the past few years, because of oil discoveries, and the city officials have been compelled to do a vast amount of emergency work. This work has been accomplished, I am sure, much more speedily and with more satisfactory results than could have been accomplished under the old form."

ELIZABETH CITY, N. C. (10,000)

Secretary, Chamber of Commerce.—"The people in general feel that the city manager plan has been a success in every way in Elizabeth City."

GLENDALE, CALIF. (11,500)

R. M. Jackson, Secretary, Chamber of Commerce.—"The city manager plan is a success in Glendale. It has resulted in efficient government and has measured fully up to expectations. The people are well satisfied."

GRIFFIN, GA. (8,240)

W. B. Royster, Manager, Board of Trade.—"Griffin feels very proud of what has been accomplished under the city manager plan of government. We hope that Sacramento will soon be added to the rapidly growing list of enterprising communities which have availed themselves of this remarkably successful form of government."

HAYS, KANS. (2,339)

R. S. Markwell, President, Chamber of Commerce.—"The city manager plan is giving general satisfaction here. *The affairs of the city have been put upon a business basis, and a gradual reduction in the tax rate is in sight. We believe it is the best form of municipal government.*"

KINGSPORT, TENN. (5,692)

Secretary, Chamber of Commerce.—"The city manager form of government has been a success in Kingsport. *It has accomplished and is accomplishing the things we hoped for.*"

LA GRANDE, ORE. (6,913)

A. W. Nelson, Secretary, Union County Ad Club.—"It is my firm conviction that the city manager form of government saved La Grande from bankruptcy."

MCALISTER, OKLA. (12,095)

W. E. Harmuth, Secretary, Commercial Club.—"The city manager plan has been an unqualified success in McAlester since the day of its inauguration. This has not only been true with reference to the efficient manner in which the city's business is carried out, but in the satisfied manner in which the citizens feel toward the city government, exemplified at the recent primary election, when no candidates appeared to oppose two of the commissioners for reelection—something unheard of before in this city. The plan has given us an economical government without in any way impairing efficiency. This is so for many reasons, chief of which is the fact that the city manager has no political debts to pay, refuses any hint of politics to creep into his hiring of employees, and he alone is
(Continued on page 30)

Capitalizing Good Teeth

By Mildred Penrose Stewart, M. A. P. H.

Director, Dutchess County Health Association, New York

THE county fair was only one week off. The Dutchess County Health Association had had a most successful original health exhibit the year before, and everybody seemed to think we could do it again. Another perusal of the Routzahn's book on "The ABC of Exhibit Planning" reminded us that to have a successful exhibit one must resist the temptation to tell all one knows and must simply get a single idea over. The idea should be worth getting over and should lead the spectator to realize the importance of some definite line of the work.

One of the activities of the Dutchess County Health Association at the moment was an effort to obtain a travelling dental clinic for the county. Evidently a dental exhibit was needed—but what more stupid than posters and models of teeth, or than pictures and price lists of travelling dental clinics?

With the fair only four days off, our idea suddenly came, and from Philadelphia! "Oh, give each kid who has teeth in good condition a dollar," said the Chief Medical Inspector of Schools of that town.

Telegrams elicited the information that a

dental house in Brooklyn would lend us dental apparatus free of charge if we would come after it. A nurse in her Ford was dispatched posthaste, her presence on Fifth Avenue with her muddy Lizzy piled high with dental chair, cabinet, foot-engine, glass-shelved table, etc., causing rather scornful smiles but no serious disturbance.

Two Dutchess County millionaires with sporting blood backed the enterprise financially, though we had no way of telling how many dollars might be needed to make our offer good; seven dentists promised to give several hours of their time to examine the teeth of the children at the fair.

Then came the question of what one meant by "teeth in good condition," and the whole place was shaken to its foundation, as no two dentists could agree on this point; their discussions grew so detailed that we were really lost in a maze of dental terms and technicalities. We feared that we did not dare demand perfect teeth in case we should not find any. After all, we wanted to reward the children who had done the best possible, who had kept their teeth clean and had had all cavities filled. We wanted to



EXAMINING A CANDIDATE FOR THE PRIZE FOR GOOD TEETH

prove to unbelievers that the mouths of most children are in need of dental attention. Hence we decided that "teeth in good condition" should mean "teeth clean and with no cavities."

Dollars for Dentistry

The day of the fair came. Our tent was decorated on the outside with enormous painted cardboard toothbrushes and with a sign offering a dollar to any child between the ages of five and sixteen whose teeth were in good condition. Inside the tent a white-coated dentist and a uniformed nurse stood beside the dental chair.

The crowds began to come to the fair, but nobody came into the tent! "They'll never give you no dollar" was the muttered sentiment of passing children. Finding that the foot-engine brought terror to little hearts, we hid that implement of torture. We left the tent flaps always open and we captured a Vassar girl for a barker. She urged the children in, and, fortunately for us, the third one to arrive had clean teeth and his two or three cavities filled, so that we could give him a dollar. The barker shouted this news, and a crowd collected around us and from then on we were kept busy. In the meanwhile the first little dollar boy returned leading five or six other small boys to try for the prize.

The second day a small boy was waylaid by the nurse's protest of "Look here, you were examined yesterday." To which he calmly returned, "Yes, but I've been to the dentist and had my teeth cleaned since then." We thought he deserved the dollar! Several such enterprising infants went to their dentists to have their teeth cleaned or cavities filled and returned for the dollar. Certainly this showed an up-and-coming spirit in the future citizens of Dutchess County.

One little girl received a dollar and returned in the afternoon with her sister, who was refused because her teeth were not clean. This tragedy reduced sister to noisy tears. Later their mother took the trouble to come in and thank us for the lesson we had taught her youngest. The child would not brush her teeth and she had learned in a never-to-be-forgotten way that brushing teeth is a habit not to be despised and that mother was right.

Near our tent a nurse dressed as a clown weighed and measured children. Occasion-

ally, when business was not good,—though this was seldom, as she weighed 800 children during the fair,—she would attract attention to our tent by pretending to brush her teeth with our big cardboard toothbrushes, or by similar antics. Once our barker grew weary and her confused mind wandered between the weighing and the teeth examining, with the startling result that she suddenly began to shout, "Come in and have your teeth weighed! Come in and have your teeth weighed!" The indignant expressions on the faces of the crowd and an immediate thinning out of our clients finally made her realize that something was amiss, and she hastily changed her refrain.

A dollar represented a good deal of money to some youngsters. One child had to be dragged forcibly past our tent again and again. "But, mother, I might get it this time," was her wail. But, alas! years of neglect had left her teeth in such condition that no hurried call on a dentist could have made her eligible for the coveted prize.

In the four days of the fair the teeth of 480 children were examined and 74 dollar bills were given away. That meant that out of every six children only one had teeth which were clean and not in need of immediate dental attention. Add to this the fact that many children did not come in for examination, because they knew they had cavities in their teeth, and you may realize what a serious situation confronts the country, especially in rural districts, as our children were indicative of the situation everywhere. Consider the enormous variety of bodily ills which may originate in poor teeth. If, at the least estimate, every child in six needs dental attention, something should be done, and done quickly. The cure seems to be, first, education causing a demand for proper care, and second, the facilities for such care.

As a step toward this latter cure, the travelling dental clinic has been successful in several places. This consists of a truck containing movable equipment, which goes to the most inaccessible parts of a county. The dentist and the nurse who are in attendance put up the apparatus in some corner of the schoolhouse and there attend to the children's teeth (always with the consent of the parents).

Peoria Saves Worn Brick Streets with Asphalt

Work From 1913 to Date Has Lengthened Life of Pavement

By L. D. Jeffries
City Engineer, Peoria, Ill.

IN 1913 the first asphalt resurfacing work over old brick was completed in Peoria. An area of 9,500 yards was chosen on Fayette Street, from Adams to Knoxville. This old pavement had been laid some thirty years and had become so badly worn and disintegrated that traffic over it was almost out of the question.

traffic and shows no signs of wear after eight years of continuous service. Last year an area of 10,000 square yards was resurfaced on First Avenue in the same manner, and to-day it is one of the best-appearing streets in the city.

Main Street, 60 feet wide, with a double track running the entire length, is now un-



LAYING A 2-INCH ASPHALT STREET WITH 1-INCH BINDER COURSE ON OLD BRICK PAVEMENT, PEORIA, ILL.

The car tracks are shown raised with five rows of brick paralleling the rail on the outside. The corner shown has been cut back to a 15-foot curb radius

This being the first work of the kind in Peoria, the contractor was required to give a 10-year guarantee, and to date not a cent has been spent on repairs of any kind for resurfacing work. The resurfacing consisted of a 1-inch binder course and a 1-1/2 inch wearing course. The old brick surface was swept clean and thoroughly broomed to remove all loose dirt, and then was painted with hot asphaltic cement. All depressions in the street were filled with binder course to bring the surface up to an even grade. This street sustains an unusually heavy

der construction. This street contains 60,000 square yards outside the areas which are paved with brick. It is the main thoroughfare of the city, and naturally is the most heavily traveled. The asphalt sheet was made 3 inches thick instead of 2 1/2, as on the other street. The car tracks were all raised 3 inches, and the brick along the gutter line for a distance of 5 feet adjoining the curb was torn up and laid flat so as to maintain the same grade in the gutters and adjoining improvements. For all this work, Bermudez asphalt was used, and has proved

its wearing qualities.

The cost of resurfacing has varied from \$1.80 to \$2.00 per square yard for the finished pavement, or practically 50 per cent less than a new pavement. The writer believes it will last fully as long as a new one, inasmuch as the brick surface affords a foundation which is in every way practically equal to new concrete. This work is being done by J. W. Bushell, a local contractor.

Curbs Cut Back at Corners

The street corner shown in the illustration has been cut back to a 15-foot radius. In doing this the old catch-basin was removed and a flat grating was placed upon the old brick work. A 12-inch pipe was connected to the old basin about 3 feet below the surface of the pavement and brought in back of the curb, terminating in a 12-inch elbow and opening into the curb, as shown.

The city is spending in the neighborhood of \$6,000 this year for cutting back street corners in Peoria, and about 40 corners have been changed already. The old corners

were practically all on a 5-foot radius, and the new ones that have been established are all on a 15-foot radius. This necessitates the changing of all catch-basins, sewers, and fire hydrants. The curbs are built of concrete 6 by 24 inches, and the pavement is replaced usually by the same type of pavement existing on the street. Catch-basin castings are removed, and a flat grating is placed upon the brick work of the old catch-basin and brought up to the required grade. A 12-inch tile is then placed about 3 feet below the surface, connecting with the catch-basin and terminating in a 12-inch tile elbow which opens into a circular opening in the cement curb. This type of radius for curb corners seems to meet the approval of traveling automobilists, as it makes a very much more convenient turn and adds greatly to the general appearance of the street.

Both the resurfacing work and the cutting back of the curbs have been fostered by Mayor E. N. Woodruff and H. J. Monahan, Commissioner of Public Works.

Better to Build up Good Roads by Constant Care

IT is better to build a cheap road and keep it in good condition by adequate maintenance than to build the most expensive highway and permit it to deteriorate for want of care, say officials of the Bureau of Public Roads of the United States Department of Agriculture.

Maryland, which has one of the finest systems of improved highways in the United States, if not the best, has consistently followed this practice. The originally improved roads in Maryland were comparatively inexpensive, costing only what the taxpayers were willing to pay for. The first few years the average cost was less than \$10,000 a mile. In some cases the work entailed considerable grading and drainage, but in others it amounted simply to resurfacing the old turnpikes, which had already been graded and drained.

Generally, the roads built at that time

were macadam, 12 feet wide and 6 inches thick. Soon the width was increased to 14 feet. Later many were widened still farther, some very successfully, by adding concrete shoulders on each side of the existing macadam. This method of improving roads makes it possible for traffic to continue unimpeded on the road while the work is going on.

The macadam roads in Maryland have given very good satisfaction, but continuous care has been largely responsible for their success. The roads are constantly patrolled and no hole of any size is allowed to go unrepaired. Material for patching is kept at convenient points along the road for the use of the patrolman. From a relatively small investment in admittedly low-type road it builds up a better one from year to year, always conserving the bulk of the previous investment.

Trenching Machines vs. Hand Labor

By William R. Conard

Conard & Buzby, Consulting Engineers, Burlington, N. J.

FOR quite a period of years mechanical rather than manual methods for moving soil have been recognized as considerably more economical and efficient, provided the surrounding conditions were such that the mechanical equipment could be used to somewhere near its rated average capacity.

If the information the writer has is correct, machines for excavating trenches were first used in this country for the purpose of opening the ground for placing drainage tile in areas which unless drained would be practically valueless. By draining, such areas became of very considerable value because usually they would produce large crops with little or no fertilizing. From this beginning the use of the trench machine has spread until it is recognized as an important part of the equipment in putting in underground structures, such as water and gas pipe, domestic or storm sewers, conduits for wires, etc.

While the writer was familiar with

trenching machines, and had been connected with work where they were in use, it was not until he worked on the construction of the water system at Camp Dix, New Jersey, associated with Messrs. Hazen, Whipple & Fuller, consulting engineers, that he had any direct experience with their use.

At Camp Dix, as at all of the other cantonments, it was necessary to accomplish certain work in the shortest possible space of time. The installation of the main pipe lines for the water-works came under the writer's direct charge, and is the portion of the work with which he is the most familiar. From the first of August, 1917, until the first of September, 1917, at which time the first troops began arriving, it was necessary to install some 17,000 feet of line from the pumping station to the camp, and about 10,000 feet of distribution line within the camp. To accomplish this, three trenching machines were employed, two being used almost continuously, and the third



A PARSONS EXCAVATOR USED BY THE CITY OF HIGH POINT, N. C., IN DIGGING TRENCHES 15, 18 AND 24 INCHES WIDE AND UP TO 10 FEET IN DEPTH

after about ten days' use being shifted over to sewer lines. By August 29 the pipe was in and the water on the lines. The average day's trench by machine was probably about 800 feet, the smallest day's work being 120 feet and the largest 1,500 feet with one machine, with several days of 1,000 to 1,400 feet. The digging conditions were very good, the soil being mostly loam and gravel, which held up well, and the weather dry most of the time. From then until the last of October, when the writer went on some emergency work at the pumping station, trenches of some 40,000 feet were dug—most of the time by two machines, for short periods by three, and for others by only one—for water pipe alone, mostly with the same favorable soil conditions.

The total amount of hand and machine trenching at Camp Dix for mains and services for water and sewer lines amounted to some 375,000 feet. For this there were 670 days of trench machine work at a cost of about \$13,000 for rental of machines alone. No record of the operating costs is at hand, but the writer's recollection is that it was a total of about \$50 per day, including up-keep, operators, operating, repairs and machine rental. For the water lines during the period of the writer's experience the machine average was in the neighborhood of 900 feet per day, and the cost per foot of trench was around 6 cents. This was for the opening only, the back filling after pipe laying being extra.

In 1918 the writer was engineer in charge of the construction of water-works and sewer plants for one of the four large shell loading plants that were started on the eastern seaboard. In this construction there was some 50,000 feet of sewer and 100,000 feet of water lines to be installed, where the ground water was fairly close to the surface and there was a loose, sandy soil. On this operation one trenching machine was used on both water and sewer lines, but mostly on the water lines. Because of the soil conditions the rate of trenching was much less than at Camp Dix, running about 200 feet per day at a cost of about \$40 per

day, or 20 cents per foot. Even at this rate the cost was considerably less than for hand work, which ran between 50 and 60 cents, largely on account of the soil and the wet conditions.

By the foregoing it can be seen that trenching machines can be used to advantage under widely varying conditions. As with manual trenching, the costs vary with the conditions, so that unless the conditions surrounding any particular piece of work are considered, it is hard to form an estimate of average cost.

Assuming, however, average conditions of loam, sandy loam, gravel, or clay not too hard, and a territory in or near latitudes 38 degrees to 45 degrees north, it would seem that a machine could be used for 125 working days a season, and that for the average trench under favorable and open going conditions 400 feet is not too much to expect as the average for a day's work. This would give 50,000 feet for a season. South of latitude 38 degrees a season's use should be nearer 175 days' work, which, using the same average of 400 feet per day, would give 70,000 feet per year. At present prices for labor and materials, and figuring the interest on the investment, the depreciation, the upkeep and the cost of operation (but not the original cost of the machine) for the average machine for average work, the figures would be somewhere around \$10,000 per annum per machine, which would result in a cost per linear foot of trench for the New England, Middle Atlantic, Central and Central Western and Northwestern and Coast States of around 20 cents, and for the other or southern sections of around 14 cents.

The better plan for those figuring on the use of trenching machines, however, would be to work up data of all the varying local conditions of soil, congested or open work, width and depth of openings desired, use to which the trench will be put,—in fact, all surrounding circumstances that are likely to enter into the use of machine,—and submit to persons who have had experience with the use of machines.

The Poster Advertising Association, with representation in over 7,000 cities and towns in the United States and including in its membership nearly all of the billposting concerns of the country, has suggested to THE AMERICAN CITY that any individual or organization wishing to make complaints regarding billboards may refer its objections to the headquarters of the Association at 1620 Steger Building, Chicago, Ill. While not every outdoor advertising excess can be remedied, the Association is positive that it can often bring about considerable improvement.

Standard Schedule for Grading Cities and Towns for Fire Insurance

Part I

With Reference to Their Fire Defences and Physical Conditions

By John S. Caldwell

Engineer, New England Insurance Exchange, Boston, Mass.

EDITORIAL NOTE.—This article, which will be continued through subsequent issues of THE AMERICAN CITY, contains data of vital import to municipal officials, from several standpoints. First, it points out the system by which the National Board of Fire Underwriters grades cities and towns according to their natural and artificial means for combating fire, which thereby determine the rate of fire insurance within the city or town. It then outlines the basis of the schedule, the application of the deficiency scale, by which the score of a city in the grading schedule is lowered through lack of some vital element needed for fire fighting, and then takes up a detailed discussion of the water-supply. The portion of the article appearing in the February issue will contain the remaining discussion of the water-supply, and the organization and effectiveness of the fire department.

IT was once deemed sufficient in the determining of insurance rates for a city or town to have a water-works system, with hydrants in evidence, a fire department with apparatus, equipment and men to handle it, a fire alarm system, a police department, building laws, etc., but until quite recently it had never been considered necessary to attempt to go into any great detail regarding the efficiency of such protection.

The natural result of such a procedure is apparent. Inconsistencies brought about fire insurance rates which were not comparable with existing conditions, some being too high and others too low.

In New England the necessity for a change was realized and in 1913 the classified system of rating for dwelling house property was put into effect, whereby the cities and towns of New England are graded on a 200-point basis, allotting the 200 points to a perfect or standard city or town according to the value of its water-supply, fire department, fire alarm system, ordinances, etc., the class being determined by certain limitations of the points allotted.

Meanwhile the National Board of Fire Underwriters was engaged in the compiling of a universal schedule which could be adopted all over the country so that uniform results might be obtained in arriving at the value of the fire protection facilities of the various cities and towns. In the working out of this problem the advice of water-works officials, fire chiefs, insurance organizations, etc., was obtained, so that the final result may be said to represent the

best opinion obtainable on the various subjects considered.

It is, of course, not to be claimed that the Schedule is perfect, as the practical application has shown that various changes are necessary to meet certain local conditions, but it is felt that it is a forward step and is a vast improvement over the old method. It is this Schedule which was adopted by the National Board of Fire Underwriters in 1916, and by the New England Insurance Exchange in 1918.

The Basis of the Schedule

The Grading Schedule is based upon the plan of assigning to the various features of fire defence found in cities of the United States, points of deficiency depending upon the extent of variance from standards formulated from a study of conditions in more than 300 cities; the natural and structural conditions which increase the general hazard of cities, and the lack of laws or of their enforcement for the control of unsatisfactory conditions, are graded in the same way. The sum of the maximum points of deficiency totals 5,000 and is divided in accordance with the relative values of the features as given below:

RELATIVE VALUES		Points
Water-Supply:		
Engine Stream Basis.....		1,700
Hose Stream Basis.....	2,000	
Fire Department:		
Engine Stream Basis.....		1,500
Hose Stream Basis.....	1,200	
Fire Alarm		550
Police		50
Building Laws		200
Hazards		300
Structural Conditions		700
		5,000

It is recognized that climatic conditions affect fire losses, by reason of the frequency of fires due to the heating hazard, by retarding the response of fire apparatus, by hampering effective fire fighting during cold weather and storms, by the increase in combustibility due to hot and dry weather, and by the greater probability of fires spreading at time of high winds. These elements are to a greater or less degree common to the whole country, and therefore no deficiency is considered in the Schedule for normal climatic conditions. Some sections of the country, however, are subject to abnormal climatic conditions, and to cities in these sections a super-deficiency is applied, which will be described later. This super-deficiency is to be added to the deficiency determined by the application of the Schedule proper.

Application of the Deficiency Scale

In determining the points of deficiency to be applied to many of the items, it appears reasonable to use a graduated scale of points depending upon the per cent of deficiency, with a lesser increment for the first

is graded in per cent approximately as follows: slight 10, moderate 25, considerable 50, serious 75, and total 100. In considering the degree of such unreliability, the size of the community is considered; that is, conditions which in a city would be considered serious would in a small town be only moderate or considerable because of the less general probability of a fire occurring.

It was very early recognized, after the Schedule had been applied to representative cities and towns, that the application of the items under Fire Department produced deficiency charges in small municipalities which were out of proportion with the actual experience in such localities, due to the infrequency of fires, and it was decided to deduct from the total points of deficiency under Fire Department 10 per cent for each 1,000 population below 10,000 for certain items which were not as important in the small communities as in the larger cities.

After arriving at the total number of points of deficiency, the class of the city or town is determined from the following table:

CLASS DIVISION

A First Class City or Town is one receiving.....	0 to 500 points of deficiency
A Second Class City or Town is one receiving.....	501 to 1,000 points of deficiency
A Third Class City or Town is one receiving.....	1,001 to 1,500 points of deficiency
A Fourth Class City or Town is one receiving.....	1,501 to 2,000 points of deficiency
A Fifth Class City or Town is one receiving.....	2,001 to 2,500 points of deficiency
A Sixth Class City or Town is one receiving.....	2,501 to 3,000 points of deficiency
A Seventh Class City or Town is one receiving.....	3,001 to 3,500 points of deficiency
An Eighth Class City or Town is one receiving.....	3,501 to 4,000 points of deficiency
A Ninth Class City or Town is one receiving.....	4,001 to 4,500 points of deficiency
A Tenth Class City or Town is one receiving.....	More than 4,500 points; or without a water-supply and having a fire department grading 10th class; or with no fire protection.

30 per cent than for the remainder; that is, a deficiency of 10 per cent in good or moderately good conditions has less actual effect than where conditions are poor. Such a scale has been prepared as shown below; either the full scale, a multiple or a fractional part thereof is used, depending upon the relative weight or importance of the item under consideration.

DEFICIENCY SCALE

	Per Cent										
	0	10	20	30	40	50	60	70	80	90	100
0%	0	10	25	45	67	90	112	134	156	178	200
1%	1	12	27	47	70	92	114	136	158	180	
2%	2	13	29	50	72	94	116	138	160	182	
3%	3	15	31	52	74	97	119	141	163	185	
4%	4	16	33	54	76	99	121	143	165	187	
5%	5	18	35	57	79	101	123	145	167	189	
6%	6	19	37	59	81	103	125	147	169	191	
7%	7	21	39	61	83	105	127	149	171	194	
8%	8	22	41	63	85	108	130	152	174	196	
9%	9	24	43	65	88	110	132	154	176	198	

Where quantity or numbers cannot be used as the basis, the degree of deficiency

Let us consider in detail the various subjects which are included in the Schedule, starting first with the water-supply.

Water-Supply

1. Appointment of Employees
2. Efficiency of Executive
3. Records and Plans
4. Emergency Repair Provisions
5. Receipt of Alarms by Department
6. Normal Adequacy of Entire System
7. Reliability of Source of Supply
8. Sufficiency of Reserve Pump Capacity
9. Sufficiency of Reserve Boiler Capacity
10. Condition and Arrangement of Equipment
11. Fuel Supply or Electric Power
12. Construction of Pumping Station
13. Fire Protection of Pumping Station
14. Hazards of Pumping Station
15. Exposures to Pumping Station
16. Reliability of Supply Mains as Affecting Adequacy
17. Reliability of Installation of Supply Mains
18. Completeness of Arterial System
19. Reliability of Installation of Mains
20. Effect of Small Mains in the High-Value District Considered
21. 4-Inch Mains in System
22. Dead Ends—4- and 6-inch Mains
23. Completeness of Gridiron of 6-inch Mains

24. Quality and Condition of Pipe
25. Electrolysis
26. Spacing of Gate Valves
27. Condition of Gate Valves
28. Distribution of Hydrants in the High-Value District Considered
29. Ditto in Residential Districts
30. Condition of Hydrants
31. Size and Design of Hydrants
32. Valves on Hydrant Branch

In order to ensure efficient operation, employees on municipal systems should be under adequate civil service rules with tenure of office secure, except that cases of long tenure of office with an efficient organization are considered equivalent.

The chief executive, that is, the superintendent or chief engineer, should be competent and qualified by either experience or education, but preferably both, to efficiently fill the office.

Records and plans of the supply works, pumping stations, and distribution system, together with complete records of the operation of the system, should be in convenient form, safely filed, indexed and kept up to date.

Emergency crews shall either be on duty at all times or quickly available with an emergency wagon loaded with the necessary tools. At least one responsible employee familiar with the system should respond to fire alarms in high-value districts and second alarms elsewhere.

Alarms of fire should sound in some quarters of the department, also in pumping stations where pressures are raised or pumps started to furnish fire service; telephone service to pumping station shall be considered as 25 per cent of the total requirements, and in the event of a lack of operating force on duty, this is considered as equivalent to deficient alarm service.

The item of adequacy of the entire system is one of the most important in the whole Schedule, as here one must determine as to whether the source, including the entire supply works, has the normal ability to maintain maximum consumption demands and fire flow.

In considering the deficiency under this item, the results obtained at fire-flow tests in the most favorable location in the high-value district are used as a basis in making calculations as to the probable deficiency under maximum consumption conditions, due allowance being made for any emergency supply. The extent of the deficiency of each part of the supply works must be considered and the percentage of the most serious used.

Cities are considered on an engine basis if the fire flow available at pressure permitting direct hydrant streams does not exceed actual engine capacity plus one-third of the required fire flow, assumed to be as waste at time of fire, and the fire flow to be that obtained at the weakest part of the high-value district and at time of maximum consumption.

Allowance is also made on the ability of a system to deliver a fire supply on small fires direct without the use of engines, which increases the speed of operation of the fire department, even when full engine capacity is available.

Following is a table of required fire flow based on the population but modified by the individual characteristics of construction and hazards of the particular city or town under consideration. This table includes a probable loss from broken connections incidental to a large fire and is based on the formula $G = 1,020 \sqrt{P} (1 - .01 \sqrt{P})$, where G = gallons per minute and P = population in thousands, but in all cases consideration must be given to local conditions.

TABLE OF REQUIRED FIRE FLOW

Population	Required Fire Flow, Gallons Per Minute for Average City	Population	Required Fire Flow, Gallons Per Minute for Average City
1,000	1,000	28,000	5,000
2,000	1,500	40,000	6,000
4,000	2,000	60,000	7,000
6,000	2,500	80,000	8,000
10,000	3,000	100,000	9,000
13,000	3,500	125,000	10,000
17,000	4,000	150,000	11,000
22,000	4,500	200,000	12,000

Over 200,000 population, 12,000 gallons a minute, with 2,000 to 8,000 gallons additional for a second fire.

In residential districts: for villages or towns under 10,000 population, 500 to 1,000 gallons a minute, where the district is not congested; for cities over this population, or where the district is congested, 1,000 to 3,000 gallons a minute, with up to 6,000 gallons a minute in densely built sections of 3-story buildings.

In considering the reliability of source of supply, the effect on adequacy must be considered for such items as frequency and duration of droughts, physical condition of intakes, danger from earthquakes, floods, forest fires, ice dams and other ice formations, silting up or shifting of channels, absence of watchmen where needed, etc.

The pumping capacity must be such that with the two largest pumps out of service the remainder in connection with such storage as may be available must be sufficient to

maintain maximum consumption and fire flow at required pressure. For cities requiring less than 5,000 gallons fire flow, the relative infrequency of fires is assumed as offsetting in part the probability of a serious fire occurring at times when pumps are out of service, and allowance is made accordingly.

In cases where both low-lift and high-lift pumps are provided and reliability of supply is dependent on each, they must be considered separately and the sum of the points of deficiency applied.

There should be boiler capacity with a reserve of one-quarter the entire capacity, and in any case at least one boiler must be sufficient to operate all machinery and the pumps required to maintain maximum consumption and fire flow with allowance made for storage. Nominally there must be sufficient boiler capacity kept under at one-half required steam pressure to deliver full requirements in connection with storage for a period of two hours. With sufficient stack or forced draft capacity, an overload of 50 per cent over the maker's rating is used for fire tube boilers and 100 per cent for water tube.

The following forms and combinations of plant equipment, if of modern design and well constructed and installed, are assumed as approximately equal, advantages of each, if any, being in the order of their naming:

- a. Centrifugal or reciprocating pumps driven by steam engines
- b. Centrifugal or reciprocating pumps driven by electric motor
- c. Pumps operated by water-power
- d. Centrifugal or reciprocating pumps operated by internal combustion engines approved for this service; duplicate ignition parts to be on hand for each engine; adequate provision to be made for starting engines cold at least six times in rapid succession

All equipment must be of a design applicable to the service; service record in the plant under consideration and in smaller plants shall be considered and actual operating conditions observed; pumps to be free from knock, with low slip, and capable of operating at full speed; boilers to be well set, in good condition and with proper semi-annual inspection service; stacks to be substantially installed; electrical equipment for power to be in accordance with National Electrical Code and not liable to injury by water spray. Water-power equipment must

be accessible and properly safeguarded; operating force to be competent.

A minimum of five days' coal supply should be provided; where long hauls, condition of roads, climatic conditions or other causes make a longer interruption of delivery possible, a greater storage should be provided. Gas supply should be from two independent sources or from duplicate gas producer plant, with a storage of at least 24 hours' gas supply. Oil supply should be from underground storage of at least five days' capacity, with force feed to engine or boiler. Unreliability of gas or oil supply to boilers may be lessened by proper provisions for the use of coal. Water for power should equal at all times that necessary to meet maximum requirements and should have proper flood and ice control.

Steam piping (or gas or oil piping with internal combustion engines or to boilers) or electric transmission lines, should be so arranged that a failure in any line, or the renewal of a valve, transformer or oil pump would not prevent maintaining in connection with storage, maximum domestic consumption for two days and fire flow for ten hours. Overhead electric lines introduce a degree of unreliability which may be in part offset by storage; consideration in connection with such lines shall be given to number and duration of wind, sleet and snow-storms, character of poles and wires, character of country traversed, effect of forest fires and ease of and facilities for repairs; the use of the same transmission line from transformer or switchboard by other plants introduces a hazard of short circuit or prior use of power, and may be considered as the equivalent to the use of overhead lines in applying the Schedule.

Pumping stations and other portions of the plant should contain no combustible material in their construction; otherwise an automatic sprinkler equipment should be provided; outside hydrants and hose, inside stand-pipes and hose, and chemical extinguishers should be provided. A public fire station, if within $\frac{3}{4}$ -mile, shall be considered as giving about one-half protection. If the pumping station is not fireproof, the several sections, particularly any with high potential generating equipment, shall be separated by parapetted fire walls and openings protected by standard fire-doors and wire glass in metal frames. The station shall be protected against exposures. Elec-

tric wiring shall be in accordance with the National Electrical Code and all internal hazards safeguarded.

Under the item of reliability of supply mains as effecting adequacy will be included any and all pipe lines or conduits on which supply to the distribution system is dependent; suction or gravity lines to pumping station, flow lines from reservoirs, force mains, etc., are included, and a system may have one or all of these as part of it. Consideration must be as to greatest effect on maximum consumption and fire flow at required pressures that a break could have. If remaining pipes and storage cannot deliver even maximum consumption, allowance is made for only that amount available at required pressure. In applying, all mains which deliver from a source of supply or of storage to the high-value district must be considered. Aqueducts, of good design and of substantial construction, such as masonry on concreted steel, if properly installed, shall be considered sufficiently dependable not to require duplication, and no application will be made as to the effect of a possible break.

Under the assumption of the most serious single break, when capacity of mains from the source of supply is less than maximum consumption, deficiency shall be considered as offset by storage when the difference between maximum consumption and the capacity of the mains is equaled by one-fifth the storage after deducting fire flow for ten hours, except as restricted by the capacity of the mains from the storage. When capacity of the mains from the source of supply is more than maximum consumption, the excess capacity plus 2.4 times the storage shall be considered as offsetting deficiency if equal to the fire flow in a million gallons a day. The effect of a break in suction or discharge headers, lack of bypassing or poorly gated by-pass or arrangements at any reservoir, filter, etc., poorly arranged cross-connections, etc., must be considered; also features which would tend to cause or prevent an interruption of service, such as length of line, and two or more lines from the same or different sources or from storage.

Deficiency for each individual possible break is considered, and charge made for

the case giving the maximum total number of points, including the increase due to distance.

In considering the reliability of installation of supply mains it is assumed that they must be in good condition and reliable; cast iron, wrought iron, wood stave and masonry conduit have been found satisfactory, in various places and under certain conditions; service records and general conditions must be considered. Mains should be laid so as not to endanger each other, and their failure at stream and railroad crossings and other points where physical conditions are unsatisfactory should be guarded against; they should be cross-connected and gated about once a mile, and equipped with air valves at the high points and blow-offs at the low points.

The general arrangement of valves, specials and connections at cross-overs, inter-sections, reservoirs and discharge and suction headers must be considered with a view to quickness in shutting down breaks; the need of check valves on supply or force mains and other arrangements to prevent emptying of reservoirs at time of a break in a main must be considered, as well as ease of repair in case of breakage. If there is more than one main and conditions do not affect all, application is made in proportion to the carrying capacity affected and the degree of unreliability.

The arterial system includes the main arteries and secondary feeders which extend throughout the system. These feeders should be of sufficient size, considering their length and the character of the sections served, to deliver the fire flow necessary for the district. The basis of deficiency is applied by the results obtained in the fire-flow tests and general consideration of the arrangement.

Mains of the arterial system should not be laid across filled ground and should have special construction at railroad crossings and near bridge abutments and should be so gated that not more than $\frac{1}{4}$ -mile within the distribution system will be affected by a break. All mains should have sufficient cover to prevent freezing, with a minimum cover of 2 feet to prevent injury from traffic.

The Value of Convict Labor

Road Construction in Nebraska Materially Aided by This Means

By M. Noble

Associate Editor, Highway Report, Nebraska State Department of Public Works

MANY people have heard that in Nebraska two prisoners escaped while assisting with the work of building a small part of the 4,500-mile state highway system. The really important fact of the matter is that nearly 50 convicts are, through the efforts of the State Highway Department, living and working out of doors during the summer without causing trouble.

During the early part of April, 1920, the Department of Public Works, under which the Bureau of Roads and Bridges superintends the state highway work, decided, because of the excessively high prices bid on earth excavation, to reject all bids on road work for the four state and Federal aid projects. It was decided to take over the work, doing it by means of prison labor and utilizing the surplus war equipment, which had been turned over to the Department. By so doing, it was thought to accomplish the work at estimated prices, and at a much lower cost to the state than by contract. Accordingly, camps were established near enough to Lincoln so that state

officials might easily superintend and inspect the work as it progressed.

The Convict Labor Camp

Three camps were established, at Seward, Tecumseh and Table Rock. Each of the three camps has an average personnel of thirty and is established on lands rented from farmers. Each consists of six bunk-houses all built on portable bodies, which are light enough to be pulled by mules from one location to another. Two connecting bunk-houses provide for the kitchen and dining-room, and a third house furnishes sleeping quarters for the road foreman and guards, and is also used as an office. The houses are 20 by 9 feet and have sufficient windows for lighting and ventilation. The diner has a built-in table in the center, around which are low benches. The kitchen is equipped with built-in cupboards and a six-hole range. There are also tables of good size and height for the use of the cook. Equipment for each of the camps costs approximately \$450, and the cost of each outfit averages in the neighborhood of \$500.



ELEVATING GRADER LOADING WAGONS, ALL OPERATED BY CONVICT LABOR



TYPICAL CONVICT LABOR CAMP, NEBRASKA, SHOWING PORTABLE HOUSES

The cook has several helpers to assist in serving the men. The dining-room and kitchen are screened, and ice is provided for the refrigerators. Many of the supplies are bought from the neighboring farmers, although staple articles of food are purchased in large quantities for all the camps.

Each of the three camps has about 20 teams of either mules or horses. This stock is rented from a local contractor. The equipment for the work consists of a double outfit at each of the camps. The outfit is composed of two Holt tractors of 125-horsepower, two graders, two road-plows and a half-dozen dump-wagons. It is estimated that by using for road-building purposes the large tractors which were given to the state as surplus war equipment, at least the cost of 12 head of horses is saved. The expense of feeding the stock would average between \$1,000 and \$1,200 a month. The tractor alone consumes 65 gallons of gasoline and 3 gallons of oil per day of 10 hours.

Contrary to the practice in some states, the men do not work in prison garb, but use ordinary work clothes. The convict receives \$1.50 per day for his work, besides a tobacco allowance and food. The state penitentiary receives 75 cents per day per man, and the cook and supervisors are paid from the State Aid Road Fund. The Warden of the State Institution is quoted as saying: "The success of road work being done by convict labor depends very considerably upon the supervisors. Theirs is the task of seeing to the comfort of the men, and, in addition, they will have to be especially tactful in the treatment and handling of the prisoners."

When the convicts were chosen for road

work, they were told that they were sent out as trustees and put on their honor. The honor system is maintained throughout, and in accordance with this system the guards are designated as supervisors.

The Work Accomplished

According to estimates, over a half-million yards of grading has been completed by convicts in 1920. The project includes 14 miles of road between Tecumseh and Crab Orchard, 15 miles between Table Rock and Lewiston, 7 miles of the Seward-York-Aurora Highway in Seward County, and 9 miles of the Omaha-Lincoln-Denver Highway in Seward County. In all, 45 miles of roads will be built. At the Table Rock camp there is hard stone to excavate in some places, and in others a kind of gumbo. This rough work is being done by pickax.

There is unusual interest in athletic sports, particularly baseball, among the prisoners, who are permitted to play local ball teams. One evening the entire camp was taken to the moving picture house at the expense of the townspeople. The Table Rock camp is composed entirely of negroes and has proved one of the most satisfactory camps in Nebraska.

Most of the work that is being done in the camps is grading. This involves hauling the material from cuts or for fills a considerable distance. The graders are pulled by the Holt tractors, and approximately 6 to 8 dump wagons are used. The state employs engineers to see that the grade stakes are set correctly and far enough ahead of the actual grading each day so that the work runs along smoothly.

The Cleveland Public Hall

CLEVELAND recently set in place the cornerstone of its gigantic public hall—a building, which when completed, will be the largest structure of its kind in the United States. The hall is to cover two city blocks, its roof area will be nearly three acres, and its main auditorium or arena will have a seating capacity of 13,300. It will permit the holding of expositions larger than ever held before under one roof, and will provide facilities for amusement projects ranging from grand opera to the three-ring circus.

The arena or public hall proper is to be 370 feet long and 220 wide, yet in this vast auditorium there will not be a single pillar to obstruct the view. The whole auditorium will be lighted from the ceiling, where the use of incandescents with a total wattage of 437,000, or the equivalent of 218,000 ordinary lamps, is being planned.

South of the arena will be a unit housing a complete theater capable of seating an audience of 2,700, and with facilities for a company of 200 players. The stage of the theater unit will also be the stage of the main auditorium and will have a proscenium arch of 72 feet span, a depth of 48 feet, and an overall width of 108 feet. Fly galleries are to be done away with and nothing but modern stage-setting machinery used. The stage will include one section which can be raised or lowered in order to provide a swimming tank or an ice rink for

big spectacles. One of the notable installations to be made in the hall will be a pipe organ of such size that a 50-horse-power motor will be required to operate it.

To the north of the arena will be located another complete unit of the same approximate size as the theater unit on the south. It will be six stories in height and will include the formal lobby and some twenty convention halls with seating capacities ranging from 300 to 1,200. Restaurants, a barber shop, telephone booths and committee rooms will add to the convenience of the convention delegates.

The basement is designed for exposition purposes, and pipe lines will be installed in the basement ceiling to supply compressed air, vacuum, gas, electricity, water-power and steam to exhibitors, thus permitting the demonstration of any kind of machinery. Including the arena and formal lobby, 100,000 square feet of exhibit space will be available. Curving runways will be built from the basement to the arena floor to take care of circus parades and pageants.

The exterior of the building is to be of a modified Italian Renaissance type to harmonize with the architecture of Cleveland's Mall or Group Plan, of which it is a unit occupying a section of the easterly side. Other buildings in this group already completed and in use are the City Hall, the Court House and the Federal Building. The Public Library will probably be the next



THE LARGEST PUBLIC HALL OF ITS KIND IN THE UNITED STATES, ADAPTED FOR ANYTHING FROM COMMERCIAL EXPOSITIONS TO GRAND OPERA

unit of the group to go under construction. The original plans were drafted by former Architect F. H. Betz and F. R. Walker, consulting architect. Mr. Betz has since been succeeded by J. H. MacDowell.

It is planned to complete the arena sec-

tion by the fall of 1921. The total cost of the arena with its two units and equipment will be approximately \$5,000,000, partly provided for through a great bond issue campaign conducted by a Committee of One Hundred Organizations.

The Ash-Man Enters Constantinople

IN Constantinople, City of Superstition, the common, ordinary cur was looked upon as a "sacred scavenger" by the Mohammedans. Perhaps the superstition contained more truth than fiction, for when the dogs which flocked the streets were banished because of health measures, the streets became the breeding-place for the germs of all sorts of epidemic diseases, whereas these wandering pariahs had kept the public highways fairly clean. It was only when the more progressive citizens of Constantinople believed that there was danger of rabies that the wily ways of the dog-catcher were resorted to. The sacred canines were banished to a desert island in the Sea of Marmora, where they eventually starved to death and where their bones were found bleaching in the sun by war refugees.

The dogs have been replaced by something more modern in the way of public health utilities, and, if superstition ever enfolded the canine for the reason stated above, there are possibilities that the latest type of labor introduced by American relief workers may become known as "sacred street-cleaners." For the American Red Cross, realizing that some substitution must be made for the work of the curs, has introduced into Stamboul, that part of Constantinople known as the dirtiest city in the world, a satisfactory street-cleaning system.

The new street cleaning program is giving peace to the superstitious Mohammedan

mind. The accumulation of refuse in the city had grown worse and worse, and while the street cleaning appliance introduced by the society seems simple as compared to the modern means employed in the larger cities of the United States, it has helped to solve the problem. It is primitive but effective. Little pack-horses have been adopted. Each pack-horse is fitted with two large containers which hang from either side of the pack-saddle. A native workman, armed with spade and broom, guides the animal from trash heap to trash heap, fills the containers with the disease-breeding rubbish, and takes it to a convenient dumping ground, where it is burned.

This simple method is generally applicable in Oriental cities, in whose steep, narrow streets vehicles are often almost out of the question. Its adoption should do much to prevent the periodic ravages of epidemic diseases.



Courtesy of American Red Cross

THE EQUIPMENT IS PRIMITIVE, BUT EFFECTIVE

Dustless Streets in Fitchburg, Mass.

Pick-Up Sweeper Used—Oiling Replaces Watering

By David A. Hartwell

Commissioner of Public Works

FOR a number of years the cost of watering and oiling streets in Fitchburg was levied against abutting property. During the last fiscal year a new scheme was tried, by which watering and oiling was done at the expense of the general public. Also, practically all watering for dust laying was eliminated and oiling substituted. By doing away with any assessments for watering and oiling, the city's available revenue was decreased about \$12,000. Since there were no special assessments, abutters on sprinkled or oiled streets were not as urgent in their demands upon the Department of Public Works as in earlier years.

For some years past a trolley sprinkler and flusher has been used, at a cost of \$4,000 a year. Inasmuch as this work was limited to the streets on which there were car tracks, and was somewhat objectionable when there was much traffic on the street, it was decided to eliminate this charge during the last fiscal year.

When oil is first applied to a street as a dust layer, it is somewhat of a nuisance, but in the end it is much more satisfactory than water for laying the dust in all kinds of

weather. Two applications of oil during an ordinary season not only keep the dust laid, but are also a substantial aid in keeping the streets in repair, as the oil prevents a large amount of erosion in times of heavy rain. During the last season, as there were no assessment limitations to be considered, there was a considerable extension of the mileage of streets oiled, even covering a few country roads. It is planned to extend still further the mileage of streets and roads oiled in the coming year, because of the excellent results obtained.

The elimination of the trolley street flusher on the principal paved street necessitated some other method of cleaning, and for this purpose an Elgin motor sweeper was purchased and charged against the street maintenance appropriation. In spite of the difficulty in securing and keeping a competent operator, the machine did excellent work on smooth pavements and fair work on rough paving. The early morning sweeping of the principal retail business streets before the appearance of much traffic, aided the patrolmen in keeping the street clean.



ELGIN SWEEPER AT WORK ON FITCHBURG, MASS., STREETS

Modern Pumping Station Design and Operation

Metering of Pump Discharge, Use of Electric Power and Fuel Oil Make Operation More Economical

By Reeves J. Newsom

Commissioner of Water-Supply, Lynn, Mass.

IT has been necessary within the last two years, in order to keep abreast of the times and to get proper efficiency in operation, to make three typical changes in pumping station equipment in Lynn, Mass. A motor-driven centrifugal pump installed in 1912 in the Glen Lewis station had been so outgrown by the progress in design of this type of pump that it was economical to junk the equipment and replace it with new.

Old Station Equipment

The Walden Pond station, equipped with a steam-driven pump, became uneconomical and impractical to operate, and unable, because of its peculiar situation and the difficulty in obtaining men for its operation, to supply the amount of water needed, and it has been supplanted by a new station in a different location with electric motor-driven centrifugal equipment.

In the main pumping station, which pumps daily into the mains and equalizing reservoir, the coal situation has become so involved that we have found it necessary to change to oil as fuel for the boilers.

The Glen Lewis equipment consisted of a centrifugal pump delivering about fifteen million gallons per day against a 20-foot head driven by a 100-h. p. synchronous motor with suitable switchboard and starter. The priming pump was of the ordinary reciprocating type, belt-driven from a small motor. There was no water meter installed with this pump, and for six years it was run without any idea of the efficiency at which it was operating.

In 1918 the writer ran a series of tests using a Pitot tube meter for measuring the water, and found that at rates from 12-3/4 millions to 16-3/4 millions per day against heads ranging from 10.9 feet to 27 feet, the combined efficiency of the unit varied between 26 and 47 per cent. This unit has now been replaced by a pump which delivers about seventeen million gallons per day

against a 20-foot head driven by a 75-h. p. induction motor at 500 r. p. m. The auxiliary equipment is in all respects identical with that at the Hawkes Pond station, as is also the method of operation, which will be described later. This pumping unit at the time of its acceptance tests showed a combined efficiency of 74.5 per cent.

The Walden Pond station, built in 1902, received water into the suction well through a canal about three-quarters of a mile in length. When it was in operation, two men were required at all times to attend to the screens at the end of the canal and to control the flow of water. The equipment in the station consisted of a cross-compound Corliss engine, the piston rods of which were extended through the cylinders, and the pump attached beyond. Because of the arrangement of suction canal, discharge lines, etc., water which needed to be lifted from one pond to another only 20 feet higher was actually being pumped against a 45-foot head.

This station was used to pump water which flowed by gravity from the Saugus River to Hawkes Pond during the winter and spring months. Because of the necessity of getting together a force of engineers and firemen, it could be operated only when a steady run of water of at least two or three months' duration was assured, and today, of course, it would be impossible to get together a force of men for a short-term job of that kind. Short flood flows in the river could never be utilized, and the consumption of water by the city demands more than the steady spring flows will yield.

The New Station

All these difficulties were overcome by building a new station on the shore of one pond at a point only 500 feet from the other, and equipping the station with a motor-driven centrifugal unit. This location reduced the lift to 23 feet, including piping

losses, and the starting and stopping of the plant is so simple that all flood flows can be taken advantage of, even though they are of only one day's duration. This has practically doubled the value of the Saugus River as a source of supply.

The equipment in the new station consists of a centrifugal pump capable of delivering twenty-one million gallons per day against a 23-foot head, and is driven by a 100-h. p. induction motor at 450 r. p. m. This motor, as well as the one at the Glen Lewis station, is wound to use 4,000-volt, Y-connected current direct from the transmission line without a transformer.

The auxiliary equipment in both stations includes a two-panel switchboard, a water meter, and a priming unit, and in the Hawkes station a $\frac{1}{4}$ -inch mesh copper screen of the revolving endless chain type with suitable washing pan and hot and cold water connections for cleaning off dirt and ice.

The switchboards contain both electrical and water instruments consisting of the following: voltmeter, ammeter, oil switch of the remote control type, lighting and priming pump switches, overload release, under-voltage release, inverse time limit overload release, the power company's watthour meter, and a curve-drawing wattmeter; a clock, indicating discharge and suction gages, and recording discharge and suction gages. On the back of the panel and wired in series with the under-voltage release is mounted a diaphragm suction regulator which shuts down the pump just before it loses water. The water meters are indicating, recording, integrating instruments, actuated by Pitot tubes.

The priming pumps are novel adaptations of a direct-connected, motor-driven, hydro-turbine vacuum pump, and, complete, occupy a space only 20 x 40 inches. They are so compact that they are tucked under the outboard bearings of the pumps, and in general appearance are a part of the big units, adding practically no space to the area which they cover.

The Hawkes Pond unit showed on its acceptance test an overall efficiency of 77 per cent.

These two motor-driven installations are on the supply system, where absolutely continuous operation is not essential, and we are able, in view of this fact and the safety devices which are provided, to operate them

twenty-four hours per day for weeks at a time practically without attendance. The only labor involved is the daily changing of charts and reading of meters, and the occasional supplying of a small amount of oil to the bearings. This is done at both stations by the patrolmen on the respective parts of the reservoir system, so that there is no labor chargeable to the operation of the stations.

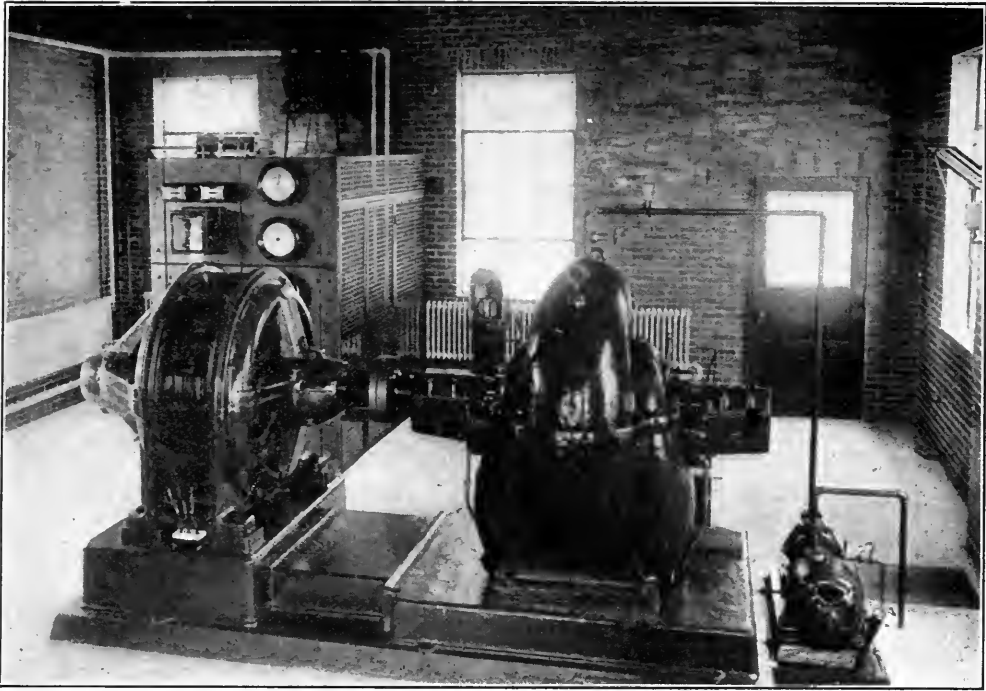
The Walnut Street station is equipped with a fifteen-million-gallon-per-day turbine-driven centrifugal pump, and two reciprocating crank and fly wheel pumps, ten million and five million gallons per day capacity respectively, power for which is furnished by two 175-h. p. boilers. There is also a motor-driven centrifugal auxiliary pump of three and three-quarter millions per day capacity, for which we purchase power from the local electric light company. As our consumption is about nine million gallons per day, it is essential that at least one boiler be in operation at all times in addition to the electric unit, and ordinarily all the pumping is done by steam, using both boilers.

The Fuel Problem

The coal problem has become very serious in two ways. At times coal is scarcely obtainable, and last winter for several weeks we had to depend on trucks coming through the deep snows from a city twenty miles distant to keep our pumps going. Then, too, the quality of the coal now on the market has made its use very uneconomical. The station duty has dropped as much as 30 per cent at times, and in order to keep up steam there has had to be wasted unburned, through the ash-pit, 18 to 20 per cent on the average, and, at times, as high as 28 per cent, of the coal fired. Combined with these facts has been the ever-rising price of coal from around \$4.00 per ton to \$16.50 at the present time.

We have made a contract for oil at the equivalent of about \$9 per ton for coal, and the price is guaranteed for two and one-half years, and the delivery of oil for five years. This contract is backed by a \$10,000 bond, which is two-thirds of the cost of the oil-burning apparatus, and the amount to be saved is such that if the oil company delivers oil for only a few months we can change back to coal without loss.

The oil situation appears to be pretty



HAWKES POND PUMPING STATION, LYNN, MASS.

Capacity of pump, 21 million gallons daily against a 23-foot head; motor, 100 horse-power. Cost of building, \$15,000; equipment, \$12,000.

stable, however, when it is remembered that enormous royalties are paid to the Mexican Government on the output of oil, and it is, therefore, vitally interested in keeping them in operation, and, further, any interference with the oil output would not be tolerated by the British and American navies. The company which delivers the oil into trucks from storage tanks in Chelsea, Mass., owns also the wells, the pipe lines, and the tank steamers which bring it to this country, so that transportation difficulties would seem to be minimized.

The Oil-burning Apparatus

The oil-burning apparatus which is being installed consists of three principal elements, the storage tank, the combined pump and heater, and the burners, with connecting piping and auxiliaries.

The storage tank is of reinforced concrete, built in two separate compartments with a total capacity of 35,000 gallons, or about three weeks' supply. A suction pipe comes from each compartment of the tank and runs to the pump inside the boiler room. These pipes are surrounded near the end by steam jackets which heat the heavy fuel oil

so that it will flow. Pipes extending to the bottom enter the tank at the same points, to which ejectors can be attached for removing water which may collect from time to time.

The pump to which the suction pipes are attached is of the double-duplex, direct-acting type, mounted above the heater, which is cylindrical in shape, the whole thing being a small, compact unit. The heater is constructed like a surface condenser, the steam being inside the tubes and the oil flowing around them. In this heater the temperature of the oil is raised to about 130 degrees F.

From the heater the oil is pumped to the boiler front, where it passes through an auxiliary heater composed of another steam-jacketed section of pipe which is used to heat the oil beyond the pump when the boilers have been banked, or when for any reason the main heater does not function properly. The piping is so arranged that all exhaust steam from the heaters and pump is returned to the boilers.

The oil then passes through a regulator and to the burners, where it is atomized by steam and mixed with air. The burners are

placed just below the location of the coal grates, the pipes coming in through the ash doors, which are entirely bricked up except for the requisite air slots.

The regulator is actuated by changes in steam pressure and controls the flow of oil to the burners. The supply of air is controlled by the position of the chimney drafts. It is possible to obtain a regulator which will also control the air, but a centrifugal pump load is so steady that practically no change is required in the amount of air needed, once it has been set to meet the atmospheric conditions for the day's run, and the complication of such a regulator is not, therefore, justified in our installation.

We use both boilers ordinarily to carry the load and to prevent its unequal distribution and the overloading of either of the boilers. Steam flow meters are being installed to show the respective outputs.

Dangers and Advantages in Using Oil

The dangers in the use of oil are two—having too hot a fire, and having the fire too concentrated. The limit to which an oil fire can be forced is usually beyond the safety point of the boiler, and so the output must be watched. If the burners are too close to the boilers, the flame may be so concentrated that the rivets in the shell will

melt. A boiler setting built especially for oil is usually very high, but a coal installation can in most cases be adapted to oil by removing the grates and putting the burners in the top of the ash-pits.

The principal advantages which will in our case be derived from the use of oil are as follows:

1. Oil is cheaper than coal.
2. It can be burned more efficiently than coal.
3. Greater boiler capacity can be developed.
4. Coal and ash handling charges will be eliminated.
5. Variation in quality will be minimized.
6. Banking of fires can be done very much more economically.
7. Neater and cleaner and better working conditions will be obtained.

The burning of oil seems to solve our problem in this station, temporarily at least, and perhaps until such time as the eventual solution, the development of available water-power, will be consummated.

Under favorable conditions steam power can be developed and used more cheaply in Lynn than electrical power, but in the case of the two stations mentioned above, which are situated on the supply system and which are operated only a part of the time, the difficulty in obtaining labor, and the higher fixed charges on steam-driven equipment, more than offset the higher cost of operating by electricity.

Damage Suits Against Municipalities for Winter Casualties

IT is not amiss to call the attention of municipal officials to the necessity of avoiding damage suits by requiring pavements to be kept clean from snow and ice. A municipality must see to it that the streets and sidewalks are in safe condition as far as they can be put in that condition by the use of vigilance.

Safety First should be applied in the building of sidewalks. All cement sidewalks should be roughened in such a manner as to insure the safety of pedestrians during the winter months. This can be done by the municipality if the owner refuses, providing a proper ordinance has been passed. It is advisable that an ordinance be framed to call for the roughening of cement sidewalks so that contractors and the owners of property will have due notice of the requirement.

It is a simple matter, and every property owner should be willing to abide by the regulation.

Safety First should be applied to the construction of area-ways, cellar doors, overhead signs and awnings. Iron plates on sidewalks should be roughened and should be examined and tested. The same applies to all cellar doors and area-ways. Fall and early winter is the best time for the work to be done, for then repairs can be made before the extreme cold weather begins. Overhead signs and awnings are another source of danger and should receive consideration at this time of the year. Wooden awnings and projecting eaves where snow and ice accumulate and may fall on pedestrians, should receive close attention on the part of municipal authorities.

Buffalo's Memorial History

By Daniel J. Sweeney

City Clerk, Buffalo, N. Y

ABOUT a year ago the city of Buffalo concluded the distribution of more than 15,000 copies of a history of Buffalo and Erie County during the period of the world war, compiled by the City Clerk under authority of the City Council. The book, with striking cover design in red, white and blue, is believed to be the most notable record of a municipality at home and overseas accomplished by any locality in America. It is both a tribute and a record, and will be valuable as a permanent reference work.

Immediately after the signing of the armistice on November 11, 1918, various societies and public officials suggested the erection of monuments, the building of memorial halls, public buildings, boulevards, parks, or recreational centers as memorials to the boys who carried the Stars and Stripes to victory along the Western Front. Buffalo officials considered all these, but finally adopted the suggestion that a history of Buffalo during the period of the world war be written and a copy given to each Buffalonian who had participated in the war as an enlisted man in the Army or Navy, Marines or Red Cross.

Mayor George S. Buck appointed a committee of one hundred representative citizens, of which Finley H. Greene, a prominent war worker in the various drives at home, was made chairman. The committee selected the City Clerk, who was a former newspaper man, as editor, and he in turn selected various associate editors to engage in the work. The greater portion of the book was written by the editor, who, by reason of his connection with the city government, had participated in all its plans to aid the National Government in winning the war. Many of the records of the city's activities were in his possession and had been filed and indexed from time to time with just such an end in view.

The Buffalo War History is a publication of 750 pages, in quarto form, and profusely illustrated with photographs and maps. It contains a roster giving the names and regimental connection of every soldier and ma-

rine, and the sailor assignments of Buffalo's naval veterans as well. It contains a list of Red Cross nurses, doctors and dentists, and a separate roster for each of the local military organizations which were called into the Federal service. The roster also gives all the citations and a complete list of the dead and wounded, and, in a descriptive way, in another section of the publication, tells when and where and how the wounds were received or death incurred.

One map shows the draft divisions of the city of Buffalo; another locates all the training camps in the United States; a third is a detailed map of the Western Front in Europe; another shows the progress of the Buffalo boys in the draft divisions in the Argonne-Meuse offensive. Other maps show the progress of the 108th Infantry on that memorial September 29th, 1918, when the great Hindenburg line was smashed; Colonel Donovan's forces of the 42nd (Rainbow) Division in the Marne salient; the Chateau-Thierry and the St. Mihiel engagements.

The other illustrations begin with the dinner held at the Bankers' Club in New York City on November 3, 1915, to formulate plans for national preparedness, at which Joseph M. Choate, former Ambassador to Great Britain, presided, and which was attended by Louis P. Fuhmann, then Mayor of Buffalo. Every step of Buffalo's part in the war; the preparedness parades and meetings; the assembling and dispatch of all National Guardsmen to the Mexican border; their return; the organization of the draft units; their departure for the training camps; views at the training camps and on the trip across; intensely interesting photographs from the air and on land, of notable battlegrounds and of Buffalo boys before and after battles, on shell-torn roads in France, at work and at play; their trip home; the welcoming parades;—all unfold in attractive sequence as the reader turns the pages of the book. Many are the photographic reproductions of scenes at home while the Liberty Loan, the Red Cross, the War Savings Stamp and other war work

committees carried on their labors.

The book was paid for by the city government. The cost of publication—over \$50,000—exceeded somewhat the amount anticipated, but the work was so complete and so well produced that the citizens, generally, received it with delight. The first 10,000 copies were produced at an average cost of \$3.90 apiece. The distribution was through the City Clerk's office. Each soldier who presented his discharge, which was properly stamped against duplication, received a copy of the book. The books were delivered to the City Clerk's office in lots of 500. On each delivery fully twice the number of applicants presented themselves as there were books available, and on one occasion it was necessary to secure police reserves to facilitate the delivery, more than 3,500 people having banked themselves in and about the corridors of the City Hall and the surrounding streets, seeking to obtain copies of the book. The tremendous increase in the cost of white paper and of labor has increased the cost of the book, but the Council ordered

5,000 additional copies to meet the demand of returning soldiers.

The work was undertaken at a time when the boys were still overseas, but as they straggled home from the debarkation camps many interesting tales and valuable data were obtained from them. A city undertaking such a work at this time would be in a position to write a narrative with greater historical completeness and fuller details of important events, but it would necessarily lack the atmosphere in which the Buffalo work was undertaken and carried on. One would, perhaps, be more prosaic, or calculating, in the preparation of a history at this time. While many valuable data, unavailable at first, could be included in a new work, much of value would be lost because of the lapse of time.

It seems to be the consensus of opinion of those throughout the country who have obtained copies of the book that the city of Buffalo has erected an historical monument in this publication which will be the pride of the citizens for many years.

Is the City Manager Plan a Success?

(Continued from page 8)

responsible for the success or failure of the executive end of the government. Thus the city manager form allows of the elimination of the cumbersome 'majority' of city officials before even the smallest item can be carried out."

PETOSKEY, MICH. (5,064)

J. Frank Quinn, Secretary, Chamber of Commerce.—"The present form of our city government—city manager—is superior to the previous form in both efficiency and economy. This is the expression of every Petoskey business man with whom I have talked on the subject."

PORTLAND, MICH. (2,747)

Fred J. Mauren, editor.—"Portland's affairs have been handled by a city manager for more than a year, and the plan has given excellent satisfaction. There is no dodging responsibility—no passing the buck. The city's business is being transacted with greater simplicity, more satisfactorily and with less expense than under the old plan."

REDDING, CALIF. (5,000)

Leslie Engram, City Clerk.—"Redding has a modified form of the city manager government. It has given splendid results."

ROCK HILL, S. C. (8,809)

Secretary, Chamber of Commerce.—"The city manager plan has been a success in Rock Hill, has given efficient and economical government, and the people are well pleased with the results."

SAN ANGELO, TEX. (9,392)

Thomas F. Owen, Secretary, Board of Development.—"Most decidedly, the city manager plan has been a success in San Angelo. We adopted it in 1915. Two years ago an attempt was made by some disgruntled politicians to overthrow it, but they were beaten by a

vote of nearly four to one. If you want to eliminate politics from city government, if you want your city to be operated successfully, have it run by a city manager. *It is the only way to secure the best results for the taxpayer, to establish efficiency, and to save money.*"

SANTA BARBARA, CALIF. (19,441)

C. W. Kirk, Secretary, Chamber of Commerce.—"There seems to be no objection to the city manager plan in Santa Barbara. Everything is running along smoothly."

SAULT STE. MARIE, MICH. (12,096)

Charles E. Chipley, Industrial Secretary, Civic and Commercial Association.—"From our experience, *the city manager form of government is businesslike, and for that reason much superior to other forms.* I believe it will ultimately be adopted by every city in the United States. A city is the largest corporation in which its citizens are commonly interested, and fixed responsibility and businesslike management are essential to its proper and profitable conduct. The efficiency of the city manager form is largely dependent upon the personnel of the commission and the ability of the manager, but, regardless of this, *the government of the city will be superior because of the plan itself.* In brief, the arguments in theory and practice are all in favor of the city manager form, and the final result would warrant any inconvenience which might result before the same operates smoothly."

XENIA, OHIO (9,110)

Lewis C. Tingley, Secretary, Chamber of Commerce.—"We consider the city manager plan a great success, and *it is giving this city a cleaner and more efficient government than before.* After two years' experience we have found it more economical and far more efficient. The inauguration of the new form of government meant the passing of an old political machine."

Forward Steps

*Reported to THE AMERICAN CITY
by Municipal Officials & Department Heads*

City Managers

Cinders and Tar Build Good Road

MANISTEE, MICH.—Early last spring a movement was started in Manistee, Mich., and sponsored by the local Board of Commerce, having as its objective a boulevard or driveway of a permanent nature leading from the heart of the city through an expanse of sandy flats and dunes to the shore of Lake Michigan, a distance of about 3,600 feet. This, it was argued, would serve a two-fold purpose: it would give Manisteeans and visitors to our city access to one of our greatest resort assets, Lake Michigan, and at the same time open up for development as summer resort property a vast amount of hitherto almost worthless land.

The proposed project was presented to the City Commission with a request that it be given consideration and that some action looking toward the construction of such a road be taken at once, in order that, in the event of its becoming a reality, it might be available for public use during the season of

1920. The Commission in turn referred the matter to the writer, who holds the dual position of City Manager and City Engineer, for recommendation.

After a careful survey and study of conditions, a concrete roadway 18 feet in width was recommended, and met with hearty approval, but at that point a stumbling-block was encountered. There were not sufficient funds available for the immediate construction, and, as time seemed an important factor, it was inexpedient to issue bonds; furthermore, the likelihood of carrying a bond issue seemed slight. The writer then began casting about for some other method or type of construction that would insure a permanent or a semi-permanent roadway at a much less expense.

From several of our largest mills we have an almost unlimited supply of coal cinders, which for years past have been placed on our outlying and unimproved streets. These when well rolled and oiled, present a fair roadway for light traffic. With this in mind, the writer proposed that the boulevard be graded through to the lake and that on the sand subgrade a mat of cinders be placed, well rolled, and covered by macadam surface rolled into the cinders and then bound



THIS ROADWAY, CONSTRUCTED AT LOW COST, CONNECTS MANISTEE WITH LAKE MICHIGAN
AND OPENS NEW OPPORTUNITIES FOR SUMMER-RESORT DEVELOPMENT

with tar. This method was adopted, and the result has been so gratifying that I give you the construction, step by step, and the cost, in the hope that it may prove of benefit to some other locality or individual.

The site of the proposed road was first graded; as the grade was established, the cuts balanced the fills and no sand was taken out nor hauled in. Upon this subgrade was placed a mat of cinders, averaging about 12 inches in thickness and 24 feet wide, that being the width of the finished roadway.

This cinder mat was wet down and rolled thoroughly and the soft spots which showed up after rolling were filled in with more cinders and again rolled, until the whole surface was uniformly hard and smooth. For this rolling an Austin-Western 5-ton gasoline tandem roller was used most satisfactorily.

Upon this cinder base was then placed a 1½- to 2-inch course of ¼- to ¾-inch crushed stone, which was rolled into the cinders. Great care was exercised here that the stone covering should leave no cinders exposed which would present a soft spot to traffic over the road.

A tank car of Tarvia "A" was purchased and applied hot by auto distributor in the proportion of about one gallon to a square yard of road. Immediately following its application, gangs of men spread over it another coating of the same sized stone to the thickness of about one inch, and this stone was again rolled.

Upon completion of this operation another application of about ½-gallon of binder to the square yard was used for a width of about 10 feet down the middle of the roadway, and the second application was covered with sharp sand. The road was then ready for use, the sand being allowed to iron into the roadway under traffic, and presented a smooth, hard surface. After one season of very hard usage, no holes, bumps or scarifications are apparent, and it is the intention of the writer to build onto this surface again in the near future by the application of more Tarvia and sand for the full width of the roadway.

The total cost of the work as completed to date was \$7,777.94 for about 9,200 square yards, or approximately 85 cents per square yard. The total cost is subdivided as follows:

Grading	\$ 835.00
Cinders, 3,100 cu. yds. @ 41c. (cost of hauling)	1,271.00
Stone, 412 cu. yds. @ \$2.70.....	1,112.40

Tarvia "A," 10,000 gal. @ 18c. (cost applied)	\$1,800.00
Rolling roadway, 21 days @ \$10.00.....	210.00
Labor	2,549.54
Total	\$7,777.94

NOTE.—Labor comparatively low in Manistee: teams \$8 per day, including teamster; foreman \$115 per month; common labor 40 cents per hour.

P. H. BEAUVAIS,
City Manager.

Park Departments

Organized Gardening

DES MOINES, IOWA.—Is a garden commission worth while? Des Moines thinks so.

Mayor MacVicar appointed Des Moines' first Garden Commission in 1916, and under it was coordinated the garden work of the newspapers, the park department, the public schools, and the county agricultural agent. The first year of the Garden Commission's régime a garden expert from the Iowa State Agricultural College was engaged for six months as secretary of the Commission. His salary was financed by the Park Department and popular subscription. The second year the schools became actively affiliated with the organized garden work, and the school garden supervisor was appointed garden superintendent for the Commission. Under him there were eight supervisors for school and city gardens. Vacant lots were listed for the use of gardeners without lots. A great deal of help was derived from the city weed ordinance, whereby the Commission was empowered to list for gardening purposes all vacant lots where weeds remained uncut. These lots, for the most part, belonged to out-of-town owners with whom the Commission was unable to get in personal touch in order to get permission to assign the lots for gardening. More than three hundred lots were obtained under this ordinance. Resident owners of vacant lots who were not gardening themselves were, as a rule, glad to list their lots for the benefit of the lot-less gardeners.

Prizes and shows were given in connection with the gardening work. The prize junior market gardener was a twelve-year-old girl who cultivated the back yard of the family premises, raising vegetables for the table use of her family, for canning which she did herself, and for marketing. Each market day, all season, she hauled her little express wagon full of vegetables to the

city and sold them. She raised more than fifty dollars' worth of vegetables from her back-yard patch.

Besides the senior Garden Commission, on which are representatives of the city Park Department, the Federation of Women's Clubs, the public schools, and the County Agricultural Department, there is a Junior Commission composed of school children. The Junior Commission works with the Senior Commission. Each garden district in the school organization has its captain and lieutenants, and each school has two representatives on the Commission. More than 2,200 gardens were listed by junior garden club members last summer.

Beautification of lawns and premises was added to the gardening activity encouraged by the Commission this year. Prizes were offered for the greatest improvement in premises during the season, and hundreds of entries were made in the contest.

H. B. FRASE,

Superintendent of Parks and Public Property.

Public Safety Departments

Swinging Sema- phores for Safety Signs

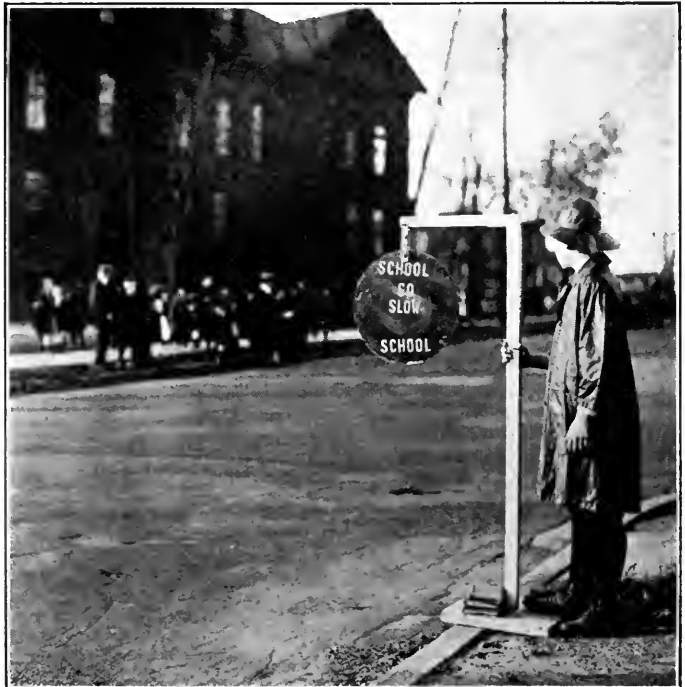
YOUNGSTOWN, OHIO.—Every school principal realizes that one of the greatest problems which he is called upon to meet is that of protecting school children from the menace of reckless automobile driving. In Youngstown, the principal of the Parmelee School has contrived a device, illustrated in the accompanying picture, which has been used successfully in minimizing the danger of accidents near the school.

Parmelee School is located on one of the busiest streets in the residence section, and along the main thoroughfare to Cleveland. It is, of

course, much used by fast motor traffic. Two hundred and thirty-two pupils have to cross the street four times each day.

Recently two swinging semaphores were made, 84 inches in diameter with an inner 6-inch circle painted green, the color of safety, the rest of the disk being red. The larger disk contains the word "School," and the smaller, "Go Slow." One of the older boys has been appointed Safety Director for the school, and he, in turn, appoints two other boys to aid him in this service. These boys place one of the semaphores at the curb about 100 feet from the school to the north, and the other about the same distance to the south. The boys keep the semaphores swinging during the entire time they are at the curb, so that drivers cannot fail to see them. The motion attracts more attention than would a stationary sign. In the meantime, all pupils who have to cross the avenue in going to or from school are required to cross between two white lines, six feet apart, in front of the school. This crossing is directly under the observation and supervision of the principal.

When not in use, the semaphores are kept in the school building, and are carried to their places just before each dismissal and assembly time.



THE SWINGING SIGN COMPELS MOTORISTS' ATTENTION

The success of the device and its effect upon traffic has been marked. Out of hundreds of machines that pass the school every day, only two machines so far have failed to slow down.

Youngstown people are very highly pleased with the results thus far obtained, and many parents of school children, to show that their appreciation is more than mere sentiment, have called at the school in person to express their thanks for the efforts made to safeguard their children.

E. S. FREED,
Principal Parmelee School.

Recreation Departments

Now That the Saloon Has Gone

LOS ANGELES, CALIF.—Some time ago the Los Angeles Playground Commission, realizing the need for gathering places for men, particularly after the elimination of the saloon, conceived the idea of providing a place where men could gather and enjoy wholesome, attractive recreation. Individual clubs and city organizations, particularly the Municipal League in this city, were also interested in such a plan, and after several conferences the Municipal League, with the support of other organizations, presented to the City Council a plan for providing what might be termed a substitute for the saloon.

After much persuasion and discussion the City Council appropriated funds for rental and partial equipment of a three-story building in a down-town section, for this experiment. The Playground Commission, taking over the management, started to equip and put this building in shape. After several months of alterations and improvements the plant was opened in a quiet way, starting with a library, reading room, game room, pool hall, canteen, and various rooms for club meetings, large gatherings and entertainments. This building is located in a section of the city inhabited for the most part by men without large resources to spend on recreation. The equipment of the building is rather plain and meager, but it is sufficient for the needs at the present time. In addition to the plant described, there are plans for a gymnasium, and for a theater which it is hoped will develop into

what might be termed a community theater.

It is the plan to make this plant self-supporting and to give to those who attend the idea that it is their club and that there is no charity whatsoever connected with it. To bring this about, a small fee is required for practically all services, except that of the library, which offers books, magazines, papers, and the opportunity for playing quiet games without charge.

In the basement there are five shower baths, a seven-table pool hall, and a comfort station for men; the regular fee is charged for pool, 10 cents for shower bath, with soap and hot water, and no fee for the comfort station. On the first floor there is a library, with 20 by 40 feet floor space, and a canteen, a bootblack stand and a cigar stand. On the second floor there is the large gymnasium, or hall, with a stage, and adjoining are three large club or gathering rooms, and the office. On the third floor are other meeting rooms, and a balcony overlooking the auditorium.

There are no restrictions in this building. The only requirement is that those who attend shall conduct themselves properly. There are no signs posted on the walls, and the library is conducted without a librarian. Each member is put on his honor, and the library is crowded from opening to closing hour. This scheme has proved satisfactory, and no property of any value has been lost. In the canteen the usual prices are charged, and a very good quality of food is served. At an early date it is hoped to start the gymnasium classes and physical work for both young and elderly men. In addition, a social club will be promoted, and for this and for the gymnasium there will be a membership card, admitting members only, and a small fee will be charged. In this way it will take on the aspect of a regular men's club. The theater will be started with a stock company, and it is planned to work gradually into a dramatic organization in the men's club itself. If profits accrue from any of these activities they will go into the betterments of the club.

In the operation and conduct of this plant there are a manager, cooks, pool hall attendants, caretakers, gymnasium leaders, and a clerk. The aim is to make for good citizenship in so far as the city, representing the public at large, can do so. There is a definite effort to create an atmosphere of ownership, and thus increase the loyalty

and interest of the men's club in every way.

The need of such institutions is recognized in many places. The Los Angeles experiment demonstrates that they can be conducted successfully, not only from the view-point of service, but financially as well, for with monthly costs for rental, salaries, etc., in excess of \$800, the club is more than meeting expenses.

C. B. RAITT,
Superintendent, Playground Department.

Fire Departments

How to Get a Fire Truck

SOUTH NYACK, N. Y.—Jackson Engine Company No. 3, of the volunteer fire department, needed a new fire truck. A truck built for a neighboring town had been refused on account of delays in delivery, and was offered at a bargain. The opportunity was too good to resist, and Jackson Engine Company purchased it "as it stood," in an unfinished condition, paid a deposit, and drove it home under its own power.

The total cost of the truck was \$3,500. Some old equipment was disposed of, netting \$1,215 toward the purchase of the truck, leaving a balance of \$2,285. To pay this, instead of resorting to a note, the company issued bonds in \$25 denominations, paying 7 per cent and amortizing in five years, part of the interest and principal being paid each year. About half of the bonds were disposed of to members of the company, and the remainder among thrifty and public-spirited citizens. Money to meet the annual requirements on these bonds will be raised by dances or fairs.

The result is that Jackson Engine Company has a Republic 2½-ton truck, with Goodrich tires, Eiseman magneto, Continental Red Seal motor, special fire department radiator, and special hood. The steel body will carry 20 men and 1,200 feet of hose. Public interest in

the local department has been considerably increased by the novel method used to finance the purchase.

T. L. FREEMAN,
Chairman Auto Committee. Fire Department.

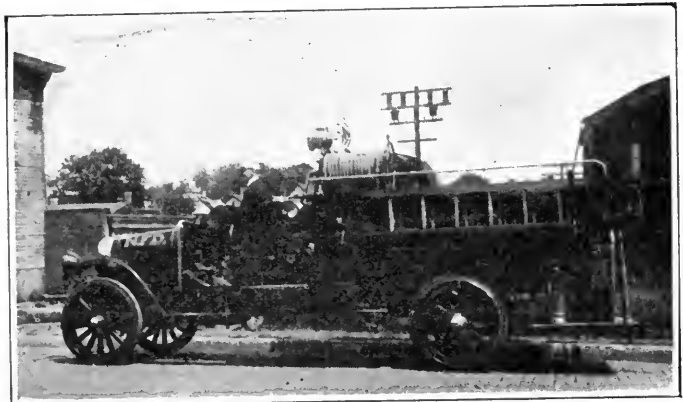
Departments of Education

Education for the Employed

SEATTLE, WASH.—The part-time school conducted by the public school system of Seattle has just been started, and it has the hearty support of such organizations as the Chamber of Commerce and community groups. This school will provide an educational opportunity for boys and girls who are employed, giving them four hours of instruction each week.

Although the movement for part-time schools in the United States is of recent origin, there are 19 states in which such schools are in operation. For many years the laws of the state of Washington have given the public school supervision over the boys and girls of the state until they have reached their fifteenth birthday, or graduated from grammar schools. This has worked well as far as it has gone. It has not recognized, however, the need of supervision between fifteen and eighteen years of age, a period in a child's life every bit as critical, if not more so, than the period before his fifteenth birthday.

Some facts secured from the school census for May, 1920, show that the situation as affecting boys and girls between fifteen



THE THRIFTY CITIZENS OF SOUTH NYACK ARE NOW PROTECTED BY THIS FIRE APPARATUS

and eighteen is not as satisfactory as it should be. There were 3,820 between these ages out of school last year. This represents about one-third of the total number in this age group. The serious part of it is that not more than 25 per cent were regularly employed. Non-attendance at school for the majority of this group does not mean employment, but idleness.

The Part Time School Law, enacted by the State Legislature in 1919, and made operative in Seattle by resolution of the Board of School Directors October 14, extends the age for compulsory attendance at school to the eighteenth birthday, or graduation from high school. A boy or girl who is regularly employed, having been issued a permit by the school authorities, will be required to attend a part-time school not less than four hours each week.

Attendance at part-time school cannot be substituted for full-time attendance at school until after the fifteenth birthday or completion of the grammar school, and then only providing the child is regularly employed and has a permit from the school authorities. A child becomes subject to full-time school attendance whenever he ceases to be employed.

The part-time school hours are specified in the law as 8 A. M. to 5 P. M., excepting Saturday, when they are 8 A. M. to 12 noon. Attendance at evening school may not, excepting by special arrangement, be substituted for attendance at part-time school.

The curriculum of the part-time school will recognize the fact that the boys and girls it serves are probably approaching the end of their school opportunity. This does not mean, however, that it will not exert an influence to get its pupils to return to the regular schools. An effort will be made to get each pupil to develop a life plan. The subjects he studies will be made as contributory to the working out of that plan as possible. He will be helped, too, to find employment that is related to the career to which he aspires. Work and school will be closely linked together. Instruction in citizenship, in hygiene, in the use of good English, and for the cultivation of a taste for reading as a use of leisure time, will make their contributions toward producing a finer citizenship.

The new law need not inconvenience employers or the employed boys and girls. Plenty of time will be allowed for adjustment to the requirements of the law. The

provisions of the law as far as employment is concerned are easily understood. No boy or girl under eighteen may be employed without a permit. This permit is valid only for the employment for which it is issued. Whenever a minor changes employers, a new permit must be issued to the new employer and the first permit must be returned to the school authorities by the first employer.

SAMUEL E. FLEMING,
Director of Department of Vocational Education,
Seattle Public Schools.

Police Departments

A Rubbish Court

DENVER, COLO.—The city of Denver makes one annual clean-up of rubbish accumulated on vacant lots and alleys. This clean-up is begun in the spring and completed about July 1. On July 15, 1920, we created the Municipal Rubbish Court, held in the City Hall Thursday of each week at 3 P. M.

The city is divided into nine districts, and one inspector is assigned to each district. He is held responsible for any violation of the city ordinances, such as throwing ashes into the alleys or putting them on vacant lots, rubbish or tin cans in vacant lots and in alleys, untidy premises, dirty yards, over-running ash-pits, and uncovered garbage cans.

Those responsible for the violation of any of these ordinances are ordered before this Court. Each case is taken up separately, and the offenders are instructed as to the ordinances and informed as to the proper disposition of rubbish and refuse. Each violator is given a copy of the ordinances and informed that, after a repetition of the same complaint he will be prosecuted before the Municipal Police Court, and fined. We do not fine any violators brought before this Court, which averages about twenty a week in attendance.

It is felt that in this way a great deal is being accomplished in keeping the city clean. In most cases the violator is embarrassed by being ordered before this Court, especially as we have many visitors, and newspaper reporters who write up the cases for the daily papers.

ARTHUR MEDARIES,
Chief, Municipal Inspection Bureau.

The Forests of Czechoslovakia

Municipal Forests in Bohemia and Slovakia Total More Than 4,000,000 Acres

IN a very interesting article in *American Forestry* entitled "The Forests of a New Republic," by E.F. Prantner, Editor of the *Czechoslovak Review*, the important fact is brought out that in Bohemian lands, including Bohemia, Moravia and Silesia, the state owns about 1,400,000 acres of forest, charitable institutions own 600,000 acres, municipalities own 2,500,000 acres, and the large estates held by private owners cover 8,000,000 acres. The article also gives interesting information about Slovakia:

"Here the state owns about 750,000 acres, municipalities hold 2,000,000, and private owners have 2,250,000 acres. This is the entire forest area of Slovakia, comprising about 5,000,000 acres. In many instances the municipalities of Slovakia were enabled to materially reduce or totally abolish direct taxation through lumbering operations in their holdings.

"A novel feature of Czechoslovak forest development is the principle that the annual growth must equal or exceed the annual cut. This is a wise and far-sighted policy. It is estimated that 6,600,000 cubic meters of firewood and 9,400,000 cubic meters of commercial timber are cut yearly. The quantity

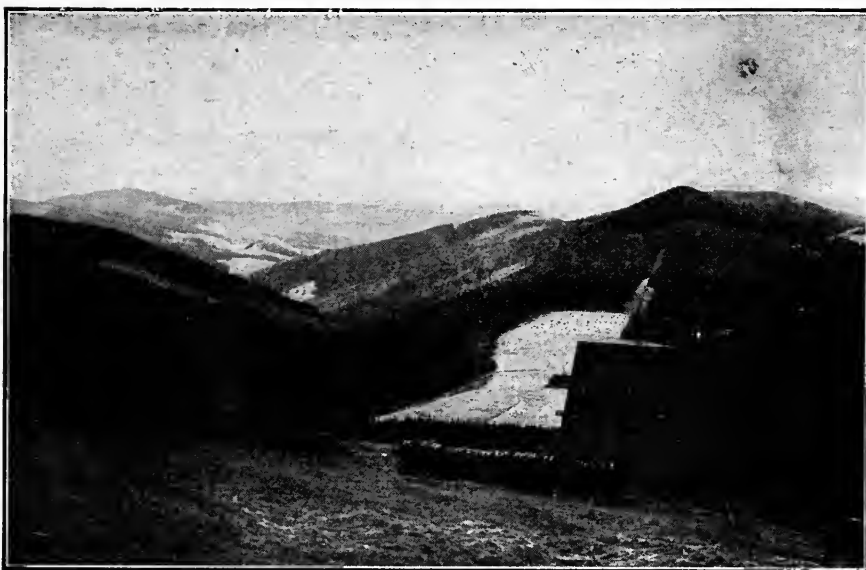
used for fuel during and since the war will be greatly reduced, in the very near future, through stimulated production of bituminous coal, lignite and oil. At the prevailing prices for lumber, competent authorities estimate the value of the annual timber cut to be about \$120,000,000.

"The policy now pursued in lumbering operations is to allow the cutting of only mature timber. On the other hand, it restricts the cutting of timber to such quantities as are added to standing timber. That is, if the increase in standing timber in a given year amounts to 20,000,000 cubic meters, then the cut for that year may be about the same quantity. If it is more or less, the cut must correspond.

"It is well to point out some of the main features of the laws governing the Czechoslovak forests. Without official sanction, no soil once used for forest purposes may be used for any other; all lumbered areas must be reforested within five years; no forest may be wilfully destroyed, or cut in such a way as to impair its usefulness for forest purposes. Regarding fire protection, the laws further provide that owners must maintain efficient and sufficient number of



A CZECHOSLOVAKIAN FOREST IN WINTER, A VERITABLE FAIRYLAND



A MUNICIPAL FOREST IN CZECHOSLOVAKIA

trained foresters and wardens, an accepted number of fire prevention devices, provisions for the extermination of injurious insects, and against trespassing.

"While nearly all of these regulations were enacted before the present Republic came into existence, the more important provisions have been adopted by the present government. However, the Czechoslovak people are awake to the importance and economic necessity of maintaining their forests on such a plane as will yield the best results. So that one of their most precious possessions, the forest, may be prop-

erly safeguarded, a commission headed by Dr. Charles Siman, Chief Forester, is now engaged in codifying the forest laws. This commission is also framing regulations for the intensive development of forests to assure a sufficient timber supply for the future. Czechoslovak forests are supervised by the Bureau of Forestry, which is a part of the Department of Agriculture. All forests are subject to the authority of this agency. It is also proposed that all forest estates over 1,250 acres in extent shall become a part of the public domain and be scientifically cultivated and cut.

Requisitioning Unused Land for Playgrounds

Land which is not in use, and which is not expected to be used in the immediate future, may now be requisitioned in Austria by national, provincial or municipal authorities and used as public playgrounds. Provisions to this effect were contained in a law enacted by the Austrian National Assembly on July 22, according to a report received by the Children's Bureau of the U. S. Department of Labor. This land will be placed in charge of organizations interested in the promotion of outdoor recreation, and will be used both by school children and young persons above school age. The owner of the land will receive suitable

compensation for its use. The question whether requisition is permissible will be decided by the provincial government, which will also decide the amount of compensation when agreement is not reached on that point.

By the terms of another law passed at the same time, rent paid for the use of any land for playground purposes may not be increased unless the taxes or the mortgage interest on the land have been increased since the rental agreement was made. The making of false statements to evade the provisions of these laws is punishable by a heavy fine or imprisonment.

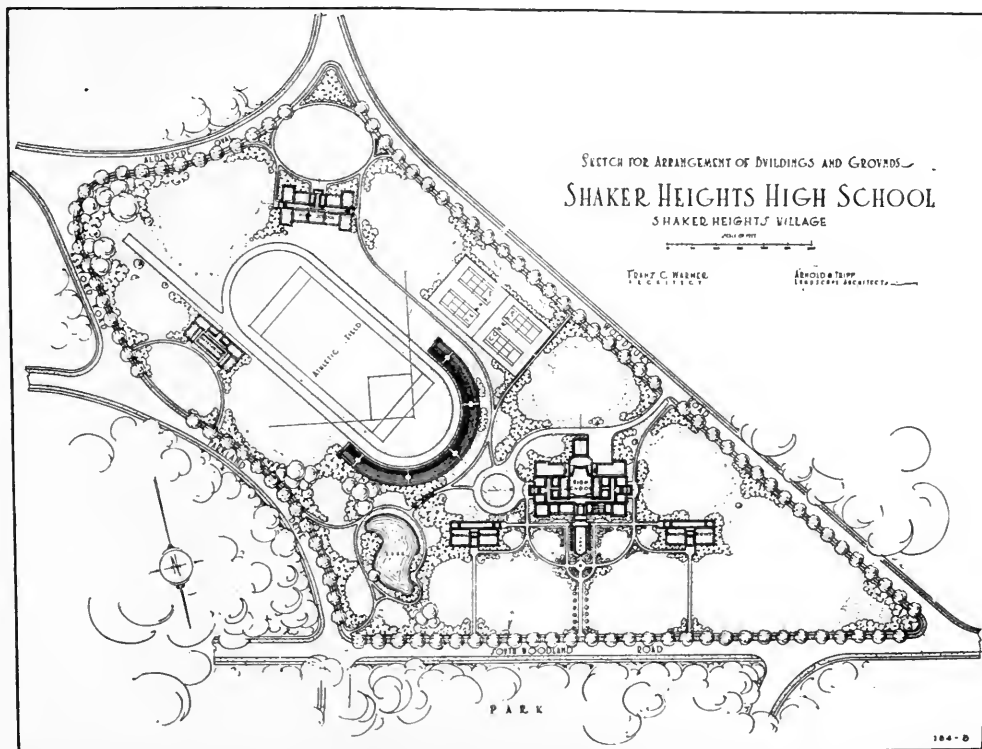
A Model High School Group for a Residential Suburb

By **B. Ashburton Tripp**

Landscape Architect, Cleveland, Ohio

SHAKER Heights Village is, perhaps, Cleveland's most attractive suburb, by reason of its natural endowments, its accessibility and the wise policy of its developers. The village possesses a town plan, made when the area within its corporate bounds was real country to Clevelanders. Exclusively a residential suburb, Shaker Heights is closely restricted as to the character of its dwellings; apartment houses and tenements are unknown, no form of industrial establishment is tolerated, and only at one point, the store center, may marketing be done. A chain of lakes, old impounding reservoirs built by the early Shaker settlers for their mills, form the nucleus of the park system, a charming reserve of natural scenery dedicated to public use.

Consistent with the ideals which established the standard of this community are the activities and aims of its Board of Education, business men of Cleveland who pride themselves on that distinction of place held by the Shaker Heights Village in the school system of Ohio. Distributed here and there throughout the village are the grade school locations, which as necessity arises become schools instead of mere sites. Shaker Heights is a growing community expanding in a well-organized manner. During the infancy of the village one large centralized building met the educational requirements quite satisfactorily both in the grades and in the High School. This period, however, was short. The rapidly increasing population made necessary additional facilities, and the



THE CITIZENS OF THIS SUBURB HAVE REASON TO BE PROUD OF THEIR SCHOOL GROUNDS

Board undertook the selection of a site for the center of the village's educational activities, there to establish the High School, around which, in an ordered manner, could be grouped future buildings to accommodate the inevitable needs of a constantly increasing population.

A 25-acre tract in the heart of the village makes possible the fulfillment of any requirements in the area it is designed to serve. As it is bounded on all sides by streets and overlooks the park system on two sides, the questions of light, air and accessibility are settled most favorably. A general scheme was prepared providing for the developing of the entire area, which consists of the following units: the main High School building; detached "wings" for use by the domestic science and manual training departments when future needs require their evacuation of the main building; the Junior High School; the athletic field, including a quarter-mile running-track encircling a combination football and baseball field; four regulation championship tennis courts; a combined locker-house and natatorium; a stadium bowl for baseball contests, outdoor meetings and dramas by the school and for community gatherings and festivals. For football games temporary stands will extend from the ends of the semicircular bowl, as permanent stands would seriously interfere with baseball and serve but little useful purpose for the rest of the year. A small pond, created by impounding the water of a stream which serves as a connecting link in the chain of lakes of the park system, lies in a depression at one end of the grounds and quite effectively ties the school reservation into the naturalistic park surroundings.

The Distinctive High School Building

The High School building, just completed, is an imposing structure of the colonial order, with a clock-and-bell tower as an outstanding feature mirrored in a formal pool at the base of the entrance steps. Its distance from the main highway on which it fronts is 250 feet. The approach is by wide formal walks of brick, and the view of this facade is unbroken except for the massed evergreen plantation which ties the building into its surroundings. A driveway winds from a side street around the rear of the building to a large turn at the carriage entrance on the opposite side of the building.

In its present arrangement there are accommodations for four hundred students. In addition to the classrooms are the auditorium, seating 400, the gymnasium, and the heating and ventilation plants.

As before mentioned, the departments of domestic science and manual training have only a temporary home in the main building, the limit of their stay depending largely on the rapidity of population increase. When this time comes, these departments will occupy separate buildings erected for their particular needs to the left and the right and slightly to the front of their parent building.

In the immediate future the Board contemplates the erection of a Junior High School building at the southern end of the grounds. This, the natatorium and locker-house, and the two buildings mentioned in the preceding paragraph, will constitute the group designed to give their special service to the entire village.

The grounds of the area have been developed with a view toward the ultimate scheme. A complete system of underground drainage has been installed, as well as a system for the watering of the lawns and shrubbery. The running-track is of the latest and best accepted construction and will bring a large share of the inter-scholastic meets to Shaker Heights because of its championship qualifying specifications. All that has been done and contemplated by the plan is for permanence and economy of up-keep.

The successful results in the development of this school group have been secured by an intelligent comprehension of the elements of a problem which had to be solved in its entirety before the location of any building was selected or work begun. By the coordination and coöperation of the resources of the Board, its architect and landscape architects, there was an economy of execution which would have been possible in no other way. The point which can never be too strongly emphasized and is so clearly brought forward in this instance is the necessity of a preconceived plan. The surroundings and their treatment in relation to the buildings are as much a part of the undertaking as any one of the structures themselves.

EDITORIAL NOTE: The architect for this group is Franz C. Warner of Cleveland. The landscape architects are Messrs. B. Ashburton Tripp, of Cleveland, and Sheffield A. Arnold, of Boston.

Water-Supply Statistics of Metered Cities

Tabulation of Data From Over 1,000 Cities in the United States and Canada

THROUGH the kind coöperation of over 1,000 water-works superintendents and engineers, as well as other municipal officials, THE AMERICAN CITY is able to publish for the benefit of its readers water-supply statistics covering a broader field and a larger number of communities than have hitherto been surveyed by any publication. The statistics include the 1920 population figures, with an asterisk to indicate figures already given out by the Census Bureau. The source of the water-supply is indicated by abbreviations which are listed below.

The statistics of metered cities only have been included in this tabulation, and if a city has had 1 per cent or more of the services metered it has been included. Many cities still retain the cubic foot measurement of water in their meter rates, but, in order to make the tabulation uniform, all rates per 100 or per 1,000 cubic feet have been changed to an equivalent rate per 1,000 gallons for purposes of ready comparison.

The first instalment of these tables, which appeared in the December, 1920, issue of THE AMERICAN CITY, contained data alphabetically arranged from Alabama through a portion of Nebraska. The current tabulation completes the statistics from the United

States and includes a number of Canadian cities.

If any errors are found in these tables, it will be considered a favor if readers will notify THE AMERICAN CITY at once, in order that corrections may be made.

The recapitulation given at the bottom of this page summarizes the meter rates for the various states and Canada in such a manner that a general idea of the prevailing rates in any state may be secured.

In order to make it possible to condense the large volume of material in a reasonably small space, a system of symbols has been adopted as follows:

- (P)—Indicates private ownership of the water-works
 *—Indicates U. S. Bureau of the Census population figures for 1920
 A.W.—Artesian Well
 B.—Bay
 Br.—Brook
 C.—Canal
 Cr.—Creek
 D.W.—Deep Well
 I.G.—Infiltration Gallery
 Imp.—Impounded
 L.—Lake
 P.—Pond
 Res.—Reservoir
 Ri.—River
 Sp.—Spring
 St.—Stream
 W.—Well
 Chl.—Liquid Chlorine
 Hyp.—Hypochlorite of Lime
 Chem.—Chemicals

RECAPITULATION

STATE	Average Highest Meter Rate Per 1,000 Gallons	Average Best Commercial Rate Per 1,000 Gallons	Average Yearly Minimum	STATE	Average Highest Meter Rate Per 1,000 Gallons	Average Best Commercial Rate Per 1,000 Gallons	Average Yearly Minimum
Alabama .....	.313	.140	12.33	Nebraska .....	.312	.142	7.03
Arizona .....	.975	.295	20.00	Nevada .....	.433	.245	12.00
Arkansas .....	.475	.168	11.83	New Hampshire..	.256	.082	9.54
California .....	.244	.15	11.68	New Jersey .....	.337	.216	8.71
Colorado .....	.205	.73	15.02	New Mexico .....	.30	.10	24.00
Connecticut .....	.286	.105	8.44	New York .....	.330	.123	7.39
Delaware .....	.10	.186	10.00	North Carolina..	.372	.158	8.52
Dist. of Columbia.	.10	.067	10.00	North Dakota ...	.455	.168	4.20
Florida .....	.347	.116	9.00	Ohio .....	.372	.154	7.30
Georgia .....	.259	.151	10.10	Oklahoma .....	.469	.138	9.90
Idaho .....	.409	.119	16.40	Oregon .....	.287	.126	11.73
Illinois .....	.304	.13	6.26	Pennsylvania ...	.295	.114	10.12
Indiana .....	.229	.092	7.29	Rhode Island ...	.33	.174	15.00
Iowa .....	.406	.175	6.95	South Carolina..	.335	.135	10.32
Kansas .....	.328	.11	7.51	South Dakota ...	.354	.142	7.67
Kentucky .....	.258	.159	11.32	Tennessee .....	.272	.122	9.68
Louisiana .....	.291	.094	8.70	Texas .....	.491	.22	10.10
Maine .....	.296	.118	17.66	Utah .....	.073	.06	5.00
Maryland .....	.215	.135	7.66	Vermont .....	.253	.81	5.70
Massachusetts ...	.396	.175	8.58	Virginia .....	.191	.077	10.42
Michigan .....	.235	.107	6.03	Washington .....	.524	.219	12.41
Minnesota .....	.337	.174	6.14	West Virginia...	.294	.084	9.60
Mississippi .....	.35	.162	12.43	Wisconsin .....	.262	.092	6.35
Missouri .....	.457	.231	7.37	Wyoming .....	.70	.217	15.00
Montana .....	.476	.09	8.25	Canada .....	.274	.106	9.71

Municipality	Population	Source of Supply	Filtered	Sterilized	Consumption		Metered at Pump	Number of Services	Number of Meters	% Metered	Meter Rates				
					Average Daily	Per Capita					Highest Domestic per 1,000 gal.	Lowest Commercial per 1,000 gal.	Minimum Annual Charge		
NEBRASKA—(Cont.)															
Cedar Bluffs.....	600	W.	No	No	5,000	8	No	142	137	97	30c	20c	\$8.00		
Columbus.....	6,000	W.	No	No	500,000	83	No	1,000	1,000	100	20c	10c	9.60		
Crawford.....	2,200	Ri.	No	No	250,000	114	No	412	365	89	12c	5c	8.00		
Creighton.....	1,800	W.	No	No	20,000	11	No	250	250	100	35c	18c	8.00		
Decatur.....	800	W.	No	No	30,000	38	No	112	100	83	26.7c	24c	9.00		
Falls City.....	5,000	W.	No	No	800,000	160	No	1,000	1,000	100	53c	11c	9.00		
Fullerton.....	2,000	W.	No	No	100,000	50	No	375	364	97	20c	.....	6.00	
Grand Island.....	*13,960	W.	No	No	3,500,000	251	No	2,400	2,400	100	16c	5c	6.00		
Hastings.....	*11,647	W.	No	No	1,800,000	155	No	2,767	2,767	100	18c	8c	5.00		
Hebron.....	2,000	W.	No	No	100,000	50	No	300	300	100	32c	13.3c	6.00		
Kearney.....	10,000	W.	No	No	500,000	50	No	1,400	1,400	100	20c	10c	9.00		
Lincoln.....	*54,934	W.	No	Chl	3,750,000	68	No	13,000	11,300	87	15c	15c	6.00		
Ord.....	2,500	W.	No	No	175,000	70	No	650	650	100	50c	15c	8.00		
Ralston.....	500	W.	No	No	72,000	144	No	107	107	100	25c	20c	6.00		
Schuyler.....	3,000	W.	No	No	140,000	46	Yes	365	361	99	26.7c	10c	7.00		
NEVADA															
Elko.....	2,175	Sp.-W.	No	Chl	525,000	241	No	580	320	56	30c	7.5c	None		
Lovelock.....	1,250	St.	Yes	No	200,000	160	No	253	240	95	50c	16c	12.00		
Pioche.....	595	Sp.	No	No	100,000	168	No	105	.....	.....	50c	50c	.....	
NEW HAMPSHIRE															
Claremont.....	9,524	Imp.	No	No	700,000	74	No	1,347	983	73	20c	10c	\$12.00		
Concord.....	*22,167	L.	No	No	2,400,000	108	No	3,883	2,589	67	22.2c	5c	10.00		
Dover.....	14,500	P.-Sp.	Yes	No	675,000	47	Yes	1,999	1,630	82	30.7c	2c	10.00		
Keene.....	11,210	L.	No	No	1,000,000	90	No	2,342	2,305	98	15c	1.5c	4.00		
Lebanon.....	6,000	Ri.	Yes	Chl	300,000	50	No	787	342	44	25c	12.5c	5.00		
Manchester.....	*78,384	L.	No	No	5,335,327	68	No	8,389	6,867	82	13.3c	9.3c	8.00		
Milford.....	4,000	W.	No	No	150,000	38	No	680	360	53	40c	12c	16.00		
Nashua..... (P)	*28,379	W.	No	No	2,600,000	92	Yes	3,900	1,500	39	24c	6c	16.00		
Newport.....	3,500	P.	No	No	300,000	86	.....	713	3	4	25c	13.5c	5.00	
Portsmouth.....	*13,569	W.	No	No	1,700,000	126	Yes	3,050	3,000	98	30c	10c	6.00		
Somersworth.....	7,030	Ri.	Yes	Chl	744,500	106	No	1,114	400	36	36c	None	13.00		
NEW JERSEY															
Belmar.....	25,000	W.	No	No	800,000	32	Yes	1,300	1,100	85	23.3c	23.3c	\$10.50		
Camden.....	*116,309	W.	No	No	14,000,000	120	Yes	22,500	1,400	6	25c	10c	8.00		
Cape May City.....	3,000	W.	No	No	1,500,000	500	No	1,300	6	5	20c	20c	15.00		
Dover.....	9,864	W.-Sp.	No	Chl	500,000	51	Yes	1,840	1,475	80	29.6c	21.3c	None		
Freehold.....	7,500	W.	No	No	550,000	73	Yes	1,200	100	8	33.3c	15.3c	10.00		
Gladstone.....	1,400	Sp.	No	No	123,000	88	No	199	199	100	33.3c	8c	8.00		
Glen Ridge.....	4,800	Ri.	Yes	No	266,000	55	No	1,025	1,025	100	\$2.00	\$1.70	.....	
Jamesburg..... (P)	1,500	W.	No	No	60,000	40	No	287	.....	.....	25c	15c	12.00
Jersey City.....	*279,864	Imp.	No	.....	54,000,000	182	.....	34,102	8,534	25	12c	6c	None
Kearny.....	*26,724	Imp.	Yes	No	2,500,000	94	No	3,750	3,750	100	20c	16c	6.76		
Madison.....	6,000	W.	No	No	500,000	83	No	1,050	1,200	100	22.5c	18c	None		
Montclair.....	*28,810	Ri.	Yes	Yes	1,476,400	51	No	4,904	5,574	100	30c	20c	10.00		
Newark.....	*414,216	Ri.	No	No	43,100,000	104	No	61,533	44,277	72	13.3c	13.3c	6.00		
New Brunswick.....	*32,779	Br.	Yes	Chl	5,500,000	168	No	6,800	2,500	37	20c	18c	15.00		
Nutley..... (P)	9,500	Ri.	Yes	Chl	350,000	37	Yes	1,900	1,900	100	40c	16.7c	7.00		
Paterson..... (P)	*135,866	Ri.	Yes	Chl	10,000,000	74	Yes	17,000	14,000	83	30c	10c	12.00		
Pleasantville, etc. (P)	10,000	Res.	No	No	300,000	30	Yes	1,800	1,700	95	32.5c	10c	6.40		
Rahway.....	*11,042	Ri.	Yes	No	2,900,000	263	No	2,400	376	2	20c	5.3c	4.00		
Sussex.....	1,200	L.	No	No	75,000	63	No	359	5	1	21.3c	5.3c	.....	
West Orange..... (P)	*15,573	Ri.	Yes	Chl	840,000	54	Yes	2,475	2,475	100	23.3c	11.3c	None		
NEW MEXICO															
Carlsbad..... (P)	2,500	W.	No	No	250,000	100	Yes	535	515	96	30c	10c	\$24.00		
NEW YORK															
Albany.....	*113,344	Ri.	Yes	Chl	20,000,000	177	No	20,674	8,310	40	13.3c	4c	.....	
Albion.....	5,500	Imp.	Yes	No	600,000	109	No	835	300	36	30c	12c	\$7.20		
Avon.....	2,550	L.	No	Chl	300,000	118	Yes	600	600	100	30c	5.5c	5.00		
Binghamton.....	*66,800	Ri.	Yes	Hyp	6,033,322	90	No	10,000	10,450	100	10c	6c	4.00		
Boonville.....	2,000	Sp.-Br	No	No	200,000	100	No	700	400	57	25c	5c	5.00		
Brockport.....	3,900	L.	Yes	Chl	255,000	65	Yes	1,200	1,200	100	50c	10c	8.00		
Buffalo.....	*506,775	L.	No	Chl	130,000,000	257	Yes	76,258	5,792	8	8c	4c	10.00		
Cape Vincent.....	1,100	Ri.	No	No	250,000	227	No	150	12	8	20c	8c	5.00		
Carthage.....	5,000	Sp.	No	No	800,000	160	No	842	482	57	48c	8c	8.00		
Catskill.....	4,728	Ri.	No	Hyp	888,494	188	No	140	195	100	13.3c	.....	15.00	
Cincinnati.....	500	W.-Sp.	No	No	Unknown	.....	No	95	90	95	40c	25c	4.00	
Corning.....	*15,820	Imp.	No	Chl	3,000,000	190	Yes	3,544	3,544	100	37c	5.5c	14.00		

Municipality	Population	Source of Supply	Filtered	Sterilized	Consumption		Metered at Pump	Number of Services	Number of Meters	% Metered	Meter Rates			
					Average Daily	Per Capita					Highest Domestic per 1,000 gal.	Lowest Commercial per 1,000 gal.	Minimum Annual Charge	
NEW YORK—(Cont.)														
Cortland	*13,294	W.	No	No	1,263,745	95	No	2,800	2,400	86	20c	4.7c	\$5.00	
Danville	4,300	Sp.-Cr	No	Chl	600,000	140	No	1,100	3	1	12c	1.5c	.....
Dunkirk	*19,336	L.	No	Chl	5,000,000	259	Yes	4,000	4,000	100	10c	5.5c	6.00	
Elmira	*45,305	Ri.	Yes	Chl	4,300,000	95	Yes	10,081	10,386	100	40c	7.5c	6.00	
Fairport	4,500	W.	No	No	150,000	33	No	900	850	94	\$1.50	4c	4.80	
Fillmore	800	Sp.	No	No	45,000	563	No	.....	10	.....	30c	16c	.....
Fort Plain	2,800	Sp.	No	No	450,000	161	No	715	48	7	22.7c	3.7c	\$1.00	
Frankfort	4,500	Sp.	No	No	Unknown	.....	No	850	800	94	25c	.....	6.00
Geneseo	2,156	L.	No	Chl	223,599	104	No	608	509	84	40c	18c	6.00	
Geneva	*14,648	L.	Yes	No	2,000,000	137	Yes	3,547	3,265	92	26.7c	6.7c	1.30	
Glens Falls	*16,591	Imp.	No	No	3,000,000	181	No	3,680	48	1	16c	3.3c	.....
Gloversville	*22,023	Imp.	No	Chl	2,500,000	114	No	4,422	4,340	98	16c	4.6c	4.00	
Hamilton	2,000	Sp.	Yes	Chl	180,000	90	No	450	450	100	33.3c	13.3c	6.00	
Herkimer	*10,453	W.	No	Chl	1,200,000	115	No	3,006	3,006	100	33.3c	10c	9.00	
Hornell	*15,025	Sp.	Yes	Chl	2,300,000	153	Yes	4,000	100	3	28c	2c	.....
Hudson	*11,745	Sp.	Yes	Chl	2,000,000	170	No	2,300	200	8	8c	5c	4.00	
Ithaca	18,000	Cr.	Yes	Chl	2,250,000	125	Yes	4,500	4,400	98	46.6c	9.3c	2.00	
Jamestown	*38,917	W.	No	No	3,250,000	84	No	9,000	9,000	100	20c	20c	6.00	
Johnson City	8,600	W.	No	No	4,000,000	47	No	1,500	1,500	100	20c	7c	9.00	
Johnstown	*10,905	Imp.	No	Chl	2,000,000	184	No	2,943	257	9	40c	6.6c	9.00	
Kingston	*26,688	St.	Yes	Chl	4,500,000	169	No	5,000	200	4	22.2c	6.7c	14.00	
Le Roy	4,800	Sp.-L.	Yes	No	125,000	26	No	935	310	33	30c	10c	6.00	
Little Falls	*13,029	Cr.	Yes	Chl	3,500,000	259	Yes	2,300	1,300	57	18.7c	4c	None	
Locust Valley	2,500	W.	No	No	Unknown	.....	No	13	12	93	50c	40c	.....
Middletown	*18,420	Sp.-St.	Yes	No	3,400,000	185	Yes	3,638	118	3	16.7c	5.3c	9.00	
Mohawk	3,000	Sp.	No	No	350,000	117	No	600	325	54	30c	5c	9.00	
Mt Morris	3,500	L.	Yes	Chl	500,000	143	.....	685	15	2	40c	5c	8.00
Mt. Vernon	*42,726	Ri.	Yes	Chl	2,300,000	54	Yes	6,400	6,400	100	40c	16c	12.00	
Newburgh	*30,366	L.	No	Chl	4,250,000	142	No	5,000	140	3	15c	10c	None	
New Paltz	1,200	Sp.	No	No	375,000	312	No	200	200	100	40c	26.7c	12.00	
New Rochelle	36,213	Imp.	No	Hyp	3,700,000	102	No	8,692	8,028	93	30c	20c	9.00	
New York City	*5,621,151	Res.	No	Chl	618,900,000	110	No	396,989	108,036	27	13.4c	13.4c	None	
N. Y. C. Brooklyn	*2,022,262	Res.-W	Yes	Chl	200,000,000	99	No	200,000	30,000	15	13.3c	.....	.....
N. Y. C. Queens	*172,775	W.	No	No	14,420,000	83	No	19,439	19,253	99	.....	9.3c	.....
N. Y. C. Richmond	*115,959	Res.	No	Chl	20,000,000	174	No	18,219	6,284	33	13.3c	13.3c	None	
Niagara Falls	*50,760	Ri.	Yes	Chl	13,000,000	257	Yes	8,000	8,000	100	8c	3c	6.00	
Norwich	8,500	Br.-L	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ogdensburg	17,000	Ri.	Yes	Hyp	2,000,000	235	No	2,100	2,100	100	33.3c	6c	8.00	
		Ri.	Yes	No	3,500,000	206	Yes	3,400	120	4	None	10c	9.00	
Oneonta	*11,582	Imp.	Yes	Hyp	2,000,000	173	No	2,650	75	3	50c	10c	10.00	
Oswego	*23,626	L.	No	Chl	5,500,000	233	No	5,777	200	3	25c	3.5c	10.00	
Owego	5,000	Br.-W.	No	No	750,000	150	No	1,250	700	56	30c	5c	5.00	
Oxford	1,654	Sp.	No	No	Unknown	.....	No	460	400	100	24c	15c	7.00
Peekskill	*15,868	Cr.	Yes	No	4,000,000	252	Yes	2,500	2,500	100	20c	13.3c	4.00	
Pleasantville	2,835	W.	No	No	98,000	35	No	638	634	99	40c	.....	7.00
Port Jefferson	2,900	W.	No	No	250,000	86	Yes	425	40	9	60c	15c	8.00	
Poughkeepsie	*35,000	Ri.	Yes	Chl	3,000,000	86	Yes	6,500	6,500	100	26.7c	21.3c	1.00	
Rensselaer	*10,823	Ri.	Yes	Chl	1,500,000	139	No	2,000	1,200	60	33.5c	9c	12.00	
Riverhead	5,000	W.	Yes	No	75,000	15	No	350	350	100	40c	20c	8.00	
Rochester	*295,750	L.	No	No	27,160,000	92	No	62,136	49,200	79	14c	10c	4.00	
Rome	*26,341	Imp.	No	Chl	7,000,000	266	Yes	5,000	150	3	20c	2c	5.60	
Salamanca	9,500	W.-Res	No	No	4,000,000	213	Yes	2,000	27	1	.....	7c	8.00
Schenectady	*88,723	Imp.	No	No	13,124,413	147	No	15,473	813	5	7c	5.5c	3.00	
Seneca Falls	6,300	L	Yes	No	1,000,000	159	No	1,641	68	4	26.5c	13.3c	12.00	
Shortsville	1,228	W.	No	No	42,000	34	No	318	318	100	20c	20c	8.00	
Sodus	1,500	Sp.	No	No	Unknown	.....	No	320	250	78	32c	15c	8.00
Solvay	7,000	L.	No	Chl	800,000	114	Yes	1,008	1,000	100	20c	12c	6.00	
Syracuse	*171,717	L.	No	Chl	27,000,000	158	No	32,168	26,969	84	14.8c	6c	4.00	
Tarrytown	5,000	Res.-Sp	Yes	Chl	900,000	180	No	1,255	1,005	80	\$3.00	\$1.50	4.00	
Troy	*72,013	Res.	No	No	17,000,000	236	No	14,000	400	3	None	5c	.....
Utica	*94,156	St.-Res	No	Chl	12,000,000	128	No	17,000	16,000	94	40c	8c	.....
Walden	5,000	A.W.	No	No	105,932	21	Yes	913	980	100	40c	40c	5.00	
Watford	5,000	Ri.	Yes	No	550,000	110	Yes	875	795	91	25c	10c	None	
Watervliet	*16,073	Cr.-Res	Yes	Chl	3,150,000	196	Yes	2,700	300	1	35c	10c	20.00	
Watkins	3,000	L.	No	Chl	160,000	53	No	500	500	100	26.7c	20c	8.00	
Waverly	5,270	Imp.	No	No	650,000	123	.....	1,400	575	41	60c	5.5c	12.00
Wellsville	5,000	Ri.	Yes	Chl	650,000	130	Yes	1,300	1,000	77	33.3c	10.7c	15.00	

Municipality	Population	Source of Supply	Filtered	Sterilized	Consumption		Metered at Pump	Number of Services	Number of Meters	% Metered	Meter Rates				
					Average Daily	Per Capita					Highest Domestic per 1,000 gal.	Lowest Commercial per 1,000 gal.	Minimum Annual Charge		
NEW YORK—(Cont.)															
Whitehall.....	6,000	Ri.	No	Chl	950,000	158	Yes	750	750	100	50c	9.5c	\$5.00		
Yonkers.....	*100,226	Imp.	Yes	Chl	9,420,485	94	Yes	10,540	10,628	100	21.3c	13.3c	8.00		
NORTH CAROLINA															
Chapel Hill.....	3,000	Cr.	Yes	Hyp	1,000,000	333	No	350	25	7	30c	20c	\$2.00		
Charlotte.....	*46,338	Ri.	Yes	Chl	3,750,000	81	Yes	7,500	7,500	100	26c	6.8c	6.00		
Concord.....	11,000	Ri.	Yes	Chl	500,000	46	No	1,100	1,050	96	31.5c	13.5c	8.00		
Elkin.....	2,000	Cr.	Yes	No	100,000	50	No	200	175	88	25c	17c	10.80		
Gastonia.....	*12,871	Cr.	Yes	Chl	1,000,000	78	Yes	1,200	1,200	100	25c	8c	8.00		
Hertford.....	2,200	W.	No	No	75,000	34	No	200	100	50	.....	.....	.....
Hickory.....	5,076	Ri.-W.	Yes	Hyp	180,000	36	No	650	650	100	32c	24c	.....	
Lenoir.....	3,718	Imp.	No	No	300,000	81	No	568	553	98	20c	7c	5.00		
Monroe.....	6,000	W.	No	Chl	150,000	25	Yes	800	800	100	50c	30c	12.00		
Morehead City.....	3,500	W.	No	No	280,000	80	No	450	60	13	40c	16c	12.00		
Newbern.....	12,158	W.	No	No	1,130,000	93	Yes	1,304	136	10	25c	8c	6.00		
Raleigh.....	*24,418	Cr.	Yes	Hyp	2,800,000	115	Yes	4,651	2,424	52	25c	7c	9.00		
Rocky Mount.....	*12,742	Ri.	Yes	No	800,000	63	Yes	1,762	1,696	96	88c	20c	12.00		
Shelby.....	4,000	Ri.	Yes	Hyp	200,000	50	Yes	570	483	85	75c	12.5c	9.00		
Statesville.....	8,500	Cr.	Yes	Chl	70,000	82	No	1,100	1,100	100	35c	15c	6.00		
Wadesboro.....	2,700	W.	No	Chl	75,000	28	No	200	200	100	50c	33.3c	6.00		
Washington.....	7,000	W.-Cr.	Yes	Chl	360,000	43	.....	900	750	84	40c	12c	8.00	
Wilmington.....	*33,372	Ri.	Yes	Chl	3,000,000	90	No	7,585	3,000	40	21.6c	11.5c	13.00		
Wilson.....	*10,653	Cr.	Yes	Chl	1,300,000	122	No	1,802	1,802	100	30c	20c	12.00		
NORTH DAKOTA															
Carrington.....	1,500	W.	No	No	33,750	22	No	185	185	100	66.7c	33.3c	\$6.00		
Dickinson.....	5,000	W.	No	No	250,000	50	No	550	550	100	83c	15c	None		
Fargo.....	*21,961	Ri.	Yes	Hyp	2,800,000	128	Yes	3,900	3,900	100	15c	15c	2.40		
Valley City.....	6,000	W.	No	No	300,000	50	Yes	660	660	100	40c	10.7c	None		
Wahpeton.....	3,500	Ri.	Yes	Hyp	365,000	104	No	625	15	2	23c	10c	None		
OHIO															
Akron.....	*208,435	Ri.	Yes	Chl	21,000,000	101	Yes	34,500	30,000	100	.....	.....	.....
Andover.....	1,200	W.	No	No	70,000	58	No	230	240	100	30c	7c	\$6.00		
Arcanum.....	1,400	W.	No	Chl	110,000	79	Yes	400	15	4	10c	7c	8.00		
Athens.....	6,200	W.	Yes	.....	800,000	129	No	1,800	525	29	20c	9c	7.00	
Barnesville.....	4,700	Imp.	Yes	Chl	400,000	85	No	800	800	100	75c	10c	None		
Beach City.....	800	W.	No	No	30,000	38	No	220	200	91	20c	15c	8.00		
Bryon.....	4,252	W.	No	No	600,000	141	No	850	850	100	30c	8c	8.00		
Celina.....	4,226	W.	No	No	350,000	83	No	876	64	7	25c	10c	6.00		
Cincinnati.....	*410,247	Ri.	Yes	Chl	55,000,000	137	No	63,587	61,716	97	18c	16c	4.80		
Circleville.....	7,500	Cr.	Yes	No	460,000	61	No	1,450	700	48	30c	10c	None		
Cleveland.....	*796,836	L.	Yes	Chl	140,000,000	176	Yes	113,000	113,000	100	5.3c	5.3c	\$2.50		
Columbus.....	*237,031	Ri.	Yes	No	21,505,000	91	Yes	38,298	37,099	98	16c	14.7c	4.00		
Conneaut..... (P)	10,000	L.	Yes	Chl	1,800,000	180	No	2,500	1,600	64	25c	6c	9.00		
Coshocton.....	13,000	W.	No	No	1,600,000	123	No	3,200	15c	5	34.7c	8c	10.00		
Covington.....	2,500	W.	No	No	70,000	28	No	478	478	100	25c	8c	5.00		
Dayton.....	*152,559	W.	No	Chl	17,500,000	115	Yes	32,000	32,000	100	12c	6c	6.60		
Defiance.....	9,000	Ri.	No	No	1,000,000	111	No	1,200	400	33	40c	6c	5.04		
Delaware..... (P)	10,000	W.	No	Chl	1,000,000	100	No	1,965	1,569	80	40c	16c	9.00		
Dennison..... (P)	12,000	Cr.	Yes	Chl	2,500,000	208	Yes	2,700	2,500	93	30c	10c	5.00		
East Liverpool.....	*21,411	Ri.	Yes	.....	3,375,000	157	Yes	4,625	506	11	77c	10c	2.40	
East Palestine.....	5,949	W.	No	.....	700,000	118	.....	1,287	167	13	25c	6c	4.00
Eaton.....	3,500	St.	Yes	Chl	300,000	86	.....	950	600	63	37.5c	25c	12.00	
Elyria.....	*20,474	L.	Yes	No	3,000,000	146	No	4,784	4,650	97	20c	20c	8.00		
Fostoria.....	12,000	Ri.	No	No	1,000,000	83	No	3,000	3,000	100	20c	.....	8.00	
Franklin.....	3,000	W.	No	No	550,000	183	No	700	60	9	15c	7c	.....	
Fremont.....	*12,468	Ri.	No	No	1,250,000	100	No	3,046	2,800	92	12c	.....	6.00	
Galion..... (P)	8,000	W.	No	No	800,000	100	No	1,700	800	47	25c	15c	11.00		
Girard..... (P)	.....	W.	No	.....	500,000	.....	No	1,500	900	78	35c	10c	5.25
Greenwich.....	876	Res.	No	No	20,000	23	No	104	104	100	25c	10c	4.00		
Hiram.....	600	Sp.	No	No	29,000	48	No	100	7	7	57c	15c	9.25		
Lakewood.....	*41,732	L.	Yes	Chl	2,975,000	71	Yes	9,050	9,050	100	12c	12c	5.40		
Logan.....	5,600	W.	Yes	No	800,000	143	Yes	1,200	35	3	30c	15c	None		
London.....	4,240	W.	No	No	800,000	188	No	1,000	100	10	25c	16c	6.00		
Lorain.....	*37,295	L.	Yes	Chl	5,000,000	134	Yes	6,500	5,400	83	\$2.00	75c	8.00		
Mansfield.....	*27,824	W.	No	.....	2,500,000	90	Yes	6,000	5,550	93	26.7c	10.7c	6.00	
Marietta.....	*15,100	Ri.	Yes	No	2,500,000	166	No	4,000	1,200	30	30c	12c	8.00		
Martins Ferry.....	*11,634	W.-Ri.	No	No	4,000,000	345	No	3,665	120	3	25c	2.5c	4.00		
Marysville.....	3,576	W.	No	No	515,000	144	No	659	37	6	25c	7c	5.00		
Massillon..... (P)	*17,428	W.	No	No	1,500,000	86	No	4,400	3,400	77	29.4c	14.7c	8.80		

Municipality	Population	Source of Supply	Filtered	Sterilized	Consumption		Metered at Pump	Number of Service Meters	Number of Meters	% Metered	Meter Rates		
					Average Daily	Per Capita					Highest Domestic per 1,000 gal.	Lowest Commercial per 1,000 gal.	Minimum Annual Charge
OHIO—(Continued)													
Middletown.....	*23,594	W.	No	No	2,090,000	89	Yes	4,800	4,375	91	\$1.25	70c	\$5.00
Milford.....	1,750	W.	No	No	110,200	63	No	387	387	100	25c	20c	7.50
Millersburg.....	21,000	W.	No	No	500,000	24	No	498	4	1	8c	8c	
Mount Gilead.....(P)	2,000	W.	No	No	175,000	88	No	420	400	95	25c	25c	10.00
Napoleon.....	4,000	Ri.	Yes	Chl	500,000	125	Yes	900	900	100	33.3c	10.7c	6.00
Newark.....	*26,718	Ri...	No	....	2,200,000	83	....	5,000	5,000	100	24c	8c	6.00
Newton Falls.....	1,500	W.	No	No	45,000	30	No	280	225	80	37.5c	17.5c	12.00
Niles.....	*13,080	Ri.	Yes	Chl	3,000,000	231	Yes	2,400	100	4	40c	6c	10.00
Oberlin.....	5,000	Ri.	Yes	No	300,000	60	No	1,300	1,125	87	27c	18c	5.00
Oxford.....	2,019	W.	No	No	350,000	174	Yes	667	430	65	21c	15c	12.60
Painesville.....	8,000	L.	Yes	Chl	1,000,000	125	Yes	2,038	2,035	99	\$2.00	70c	8.00
Port Clinton.....	4,000	L.	Yes	No	650,000	162	No	1,100	860	78	20c	9.3c	10.00
Ravenna.....	7,219	L.-Cr.	Yes	No	1,250,000	173	Yes	1,900	140	7	29c	11c	12.00
Reading.....	4,800	W.	No	No	71,752	15	No	685	685	100	26.0c	6.6c	8.00
Sabina.....	1,800	W.	No	No	10,000	6	No	300	300	100	25c	25c	6.00
Scio.....(P)	960	W.	No	No	75,000	83	No	260	80	31	40c	40c	12.00
Sidney.....	....	W.	No	No	650,000	....	No	2,060	1,900	92	28.3c	10.7c	....
Springfield.....	*60,840	Imp.	Yes	Chl	10,000,000	165	No	14,000	8,000	57	10c	6c	4.00
Steubenville.....	*28,508	Ri.	Yes	Chem	5,000,000	175	No	6,000	200	3	40c	10c	5.00
Tiffin.....	14,000	W.-Ri.	Yes	Chl	700,000	50	Yes	2,600	2,600	100	28c	14c	7.60
Toledo.....	*243,109	Ri.	Yes	Chl	28,000,000	115	No	48,804	41,591	85	13.3c	6.7c	8.50
Urbana.....	7,700	W.	No	No	1,200,000	156	No	1,556	390	25	25c	10c	6.00
Van Wert.....	10,000	W.	No	No	500,000	50	No	1,800	1,300	72	35c	10c	7.00
Wadsworth.....	5,000	W.	Yes	No	300,000	60	No	1,300	1,075	83	35c	35c	None
Wapakoneta.....	5,500	W.	No	No	400,000	73	No	1,071	1,071	100	13.3c	10.7c	5.00
Wauseon.....	3,035	W.	No	....	325,000	107	No	917	895	98	\$3.00	40c	10.80
Wilmington.....(P)	5,300	W.	No	No	145,000	27	Yes	750	700	93	25c	25c	12.00
Xenia.....(P)	10,000	W.	No	Chl	800,000	80	No	2,200	630	3	34.4c	15.9c	11.00
Youngstown.....	*132,358	Ri.	Yes	Lime	11,300,000	85	Yes	13,125	20,065	100	26.7c	10.6c	None
Zanesville.....	*29,569	W.	No	No	5,500,000	186	No	8,000	150	2	15c	6c	6.00
OKLAHOMA													
Blackwell.....	12,000	Ri.	Yes	Chl	750,000	63	No	1,421	1,400	99	40c	6.7c	\$9.00
Commerce.....	4,000	W.	No	No	50,000	13	No	500	225	45	50c	22.5c	6.00
Cushing.....	10,000	Cr.	No	Chl	300,000	30	Yes	800	710	89	75c	20c	9.20
Durant.....	10,000	Ri.	Yes	Chl	800,000	80	No	1,540	1,000	65	50c	5c	....
Heavener.....	2,700	Ri.	No	No	....	....	No	452	200	44	....	....	....
Kiefer.....	1,800	W.	No	No	200,000	111	No	300	200	67	50c	15c	12.00
Lexington.....	880	W.	No	No	30,000	35	No	200	185	83	50c	20c	6.00
Oklahoma City.....	*91,258	Ri.	Yes	Chl	8,000,000	88	Yes	15,000	15,000	100	32c	7.5c	9.00
Stillwater.....	5,600	Imp.	Yes	Chl	300,000	54	Yes	658	658	100	50c	20	16.00
Tulsa.....	*72,075	Ri.	Yes	Chl	6,000,000	83	No	10,000	9,000	90	25c	8c	9.00
OREGON													
Amity.....	600	Sp.	No	No	42,000	70	No	115	115	100	40c	25c	12.00
Baker City.....	8,500	St.	No	No	1,500,000	177	No	1,800	1,800	100	10c	5c	6.00
Corvallis.....	8,000	St.	No	No	2,500,000	312	No	2,000	2,000	100	15c	8c	9.00
Dallas.....(P)	3,000	Cr.	No	No	Unknown	....	No	825	700	85	30c	15c	15.00
Eugene.....	*10,593	I.G.	Yes	Hyp	900,000	85	Yes	2,680	2,695	99	16c	6.7c	10.80
Hood River.....	3,150	Sp.	No	No	1,250,000	397	No	700	16	2	33c	11c	12.00
Klamath Falls.....(P)	6,000	A. W.	No	No	1,000,000	167	Yes	1,200	800	67	62c	7c	16.80
Oregon City.....	7,500	St.	No	No	1,700,000	227	No	1,500	25	2	20c	20c	Varies
Portland.....	*258,288	Ri.-L.	No	....	30,000,000	116	Yes	63,171	19,331	31	10.7c	8c	6.00
Vale.....	1,200	Res.	No	No	Unknown	....	No	200	150	75	50c	20c	18.00
PENNSYLVANIA													
Allentown.....	*73,502	Sp.	No	Chl	11,700,000	159	No	21,000	250	1	\$1.067	8c	72c
Ambler.....(P)	7,000	Sp.	No	No	500,000	72	Yes	1,000	600	60	3.33c	50c	12.00
Barnesboro.....	3,050	W.	Yes	Yes	120,000	39	Yes	400	30	8	30c	8c	....
Beaver Falls.....(P)	*12,802	Ri.	Yes	Chl	3,000,000	232	No	3,000	1,800	60	14c	7c	12.24
Bellevue, etc.....(P)	50,000	W.	No	Chl	3,800,000	72	No	10,000	8,500	85	40c	15c	15.00
Bloomsburg.....(P)	9,000	Imp.	Yes	Chl	1,200,000	133	No	2,100	70	3	None	8c	14.00
Braddock.....	*20,879	Ri.	No	No	1,500,000	72	No	2,000	1,200	60	25.4c	5c	....
Bradford.....	*15,525	St.	No	No	2,500,000	161	No	4,000	110	3	4c	4c	....
Carbondale.....(P)	*18,640	W.	No	Chl	5,300,000	284	No	4,200	120	3	20c	6c	9.00
Carlisle.....(P)	*10,636	Cr.	Yes	No	1,000,000	94	No	3,000	962	32	26.7c	9.3c	6.00
Chambersburg.....	*13,171	Imp.	No	No	2,500,000	190	No	2,881	1,700	59	33.3c	4c	18.00
Chester.....(P)	*58,030	Ri.	Yes	Chl	7,500,000	129	Yes	14,600	14,600	100	34.5c	11.5c	6.96
Clearfield.....(P)	10,000	Imp.	No	No	1,750,000	175	No	2,000	195	10	20c	4c	4.00
Coatesville.....	*14,515	St.	Yes	Chl	2,000,000	132	Yes	2,500	500	20	20c	12c	12.00
Cochrannton.....	647	Sp.	No	No	6,000	9	No	250	200	80	16c	15c	4.00

Municipality	Population	Source of Supply	Filtered	Sterilized	Consumption		Metered at Pump	Number of Services	Number of Meters	% Metered	Meter Rates				
					Average Daily	Per Capita					Highest Domestic per 1,000 gal.	Lowest Commercial per 1,000 gal.	Minimum Annual Charge		
PENN.—(Continued)															
College Hill.....(P)	3,500	Ri.	Yes	Chl	200,000	57	No	500	300	60	14c	6c	\$13.24		
Confluence.....(P)	1,050	St.	No	Hyp	350,000	33	No	164	48	29	25c	5c	12.00		
Connellsville.....(P)	*13,804	Ri.	Yes	Hyp	220,000	16	No	3,200	1,000	31	33c	12c	.....	
Conneaut Lake.....	374	W.	No	No	100,000	268	No	75	14	19	30c	Spec.	6.00		
Corry.....(P)	7,000	W.	No	No	830,000	118	No	1,668	1,450	87	50c	10c	15.00		
Dawson.....	950	W.	No	No	8,000	8	Yes	140	140	100	60c	30c	6.00		
Duquesne.....	*19,011	A.W.	No	No	600,000	32	No	2,100	2,200	100	35c	35c	None		
Ebensburg.....	2,100	Sp.-W.	No	No	150,000	72	No	600	53	9	25c	15c	.....	
Edgeworth.....(P)	3,500	W.	No	Chl	1,663,000	476	No	876	876	100	42c	5c	12.00		
Ellwood City.....(P)	8,958	Cr.	Yes	Chl	2,500,000	279	No	1,800	1,800	100	50c	3c	6.00		
Franklin.....	12,000	W.	Yes	Hyp	2,500,000	208	No	3,000	80	3	35c	8c	14.00		
Gettysburg.....(P)	4,250	Imp.	Yes	Hyp	450,000	11	No	800	90	11	25c	14c	24.00		
Harrisburg.....	*75,917	Ri.	Yes	Chl	9,099,422	120	No	19,400	13,783	71	5.7c	5.7c	4.00		
Homestead.....	24,000	Ri.	No	Hyp	2,800,000	117	No	2,800	465	17	30c	15c	None		
Huntington.....	8,000	Cr.	No	Chl	900,000	112	No	1,907	60	3	15c	6c	.....	
Indiana.....(P)	7,000	Cr.	Yes	No	500,000	72	No	1,600	1,110	70	50c	15c	\$12.00		
Jersey Shore.....(P)	6,000	St.	Yes	No	1,500,000	250	No	1,400	35	3	25c	2.5c	Yes		
Johnston.....(P)	*67,327	St.	No	Chl	5,000,000	134	No	9,000	6,973	78	27c	8c	12.00		
Juniata.....	7,800	St.	No	No	400,000	51	No	1,750	3	0	6c	6c	None		
Kutztown.....	3,000	Sp.	No	Hyp	325,000	108	No	400	Setting.....	.....	40c	30c	5.00	
Leechburg.....(P)	4,000	Ri.	Yes	No	2,714,000	127	No	3,600	5,000	100	207c	6c	4.00		
Leighton.....(P)	6,000	Sp.	No	No	2,000,000	333	Yes	1,250	22	2	50c	8c	1.00		
Lewiston.....(P)	20,000	Imp.	No	No	4,000,000	200	No	3,800	195	5	20c	4c	10.00		
Mahanoy City.....(P)	16,000	W.-Sp.	No	No	1,800,000	113	No	2,000	200	10	4.8c	10.6c	6.00		
Meadville.....	*14,568	W.	No	No	2,000,000	137	No	3,267	3,405	100	33.7c	10.7c	5.00		
Media.....	6,500	Cr.	Yes	Chl	388,500	60	Yes	1,357	7	1	20c	8c	None		
Meyersdale.....(P)	4,500	Sp.	No	No	300,000	67	No	850	20	2	30c	15c	None		
Millersburg.....(P)	3,000	Sp.-W.	No	Chl	300,000	100	Yes	800	20	3	None	4c	20.00		
Millvale.....	7,961	Ri.	Yes	Chl	1,244,100	156	No	1,850	5	1	25c	8c	.....	
Minersville.....(P)	8,000	Sp.	No	No	1,000,000	125	No	2,400	40	2	26.7c	8c	18.00		
Mt. Carmel.....(P)	17,500	Imp.	No	No	600,000	34	No	3,000	1,100	37	33.3c	16c	9.00		
Mt. Union.....	6,000	St.	No	Hyp	500,000	83	No	1,400	100	7	50c	7c	18.00		
New Wilmington.....(P)	800	Sp.-W.	No	No	20,000	25	No	200	150	75	40c	25c	9.00		
Oil City.....	*21,274	W.	No	No	2,714,000	127	No	3,600	5,000	100	20c	6c	4.00		
Osceola Mills.....(P)	2,800	Sp.	No	No	375,000	134	No	550	8	1	14c	4c	8.00		
Palmerton.....(P)	7,200	W.	No	No	800,000	11	Yes	600	1,100	100	25c	9.6c	9.00		
Philadelphia.....	1,823,158	Ri.	Yes	Chl	311,000,000	171	Yes	375,000	92,000	25	13.3c	5.3c	.....	
Phoenixville.....	11,500	Ri.	Yes	Chl	1,500,000	131	No	3,300	29	9	None	8.4c	.....	
Pittsburgh.....	*588,193	Ri.	Yes	Chl	120,000,000	204	Yes	94,000	38,000	40	18c	12c	8.00		
Mt Oliver Sta.....(P)	.....	Ri.	Yes	Hyp	12,000,000	.....	No	21,000	21,000	100	24c	14c	10.00
Port Vue.....(P)	2,000	Ri.	Yes	No	40,000	20	Yes	375	300	80	20c	None	8.00		
Pottsville.....(P)	*21,785	Res.	No	No	7,000,000	322	No	6,000	300	5	20c	8c	12.00		
Reynoldsville.....	5,000	W.-Sp.	No	Chl	400,000	80	No	700	700	100	18c	7c	6.00		
Ss. Mary s.....(P)	7,000	Sp.-W.	No	.....	1,200,000	172	No	1,200	1,200	100	35c	9.5c	8.00	
Sewickley.....	5,000	Ri.	No	No	2,000,000	400	No	1,400	170	12	30c	10c	12.00		
Sharpstown.....	4,500	W.	No	Hyp	250,000	56	No	825	825	100	20c	20c	6.00		
Somerset.....	3,200	W.	No	Chl	200,000	63	No	700	750	100	23c	20c	6.00		
Springdale.....	3,000	Res.	Yes	Hyp	120,000	40	No	425	425	100	50c	50c	10.00		
Steelton.....	15,000	Ri.	Yes	No	1,800,000	120	No	2,000	1,850	93	20c	7c	8.00		
Susquehanna.....(P)	3,500	St.-Sp.	Yes	Chl	750,000	21	Yes	800	35	.....	40c	15c	24.00	
Tyrone.....(P)	9,027	St.	No	Hyp	1,000,000	111	No	2,005	14	1	10c	2c	100.00		
Uniontown.....(P)	15,609	Imp.	No	Hyp	3,500,000	224	No	3,800	3,800	100	25c	10c	12.00		
Vandergrift.....(P)	13,000	W.	Yes	No	646,230	50	Yes	2,710	2,710	100	42.6c	12c	18.00		
Wampum.....	1,000	W.	No	No	8,000	8	No	80	80	100	42c	15c	None		
Warren.....(P)	14,256	Run-Ri	Yes	Chl	1,200,000	85	No	3,100	2,450	79	35c	7c	3.00		
West Newton.....(P)	3,000	W.	No	No	80,000	27	No	580	580	100	65c	11c	15.60		
RHODE ISLAND															
Bristol.....(P)	1,500	Imp.	Yes	No	1,700,000	113	No	2,400	60	3	40c	25c	.....	
Newport.....(P)	*30,255	Imp.	Yes	Chl	4,060,000	134	Yes	7,102	150	2	40c	25c	.....	
Providence.....	*237,595	Ri.	Yes	Chl	20,528,652	87	No	32,597	31,025	94	20c	10c	8.00		
So. Kingstown, etc.....(P)	6,928	Sp.	No	Chl	680,000	98	No	834	220	25	40c	25c	32.00		
Westerly.....	15,000	W.	No	No	250,000	17	Yes	2,500	2,300	92	30c	10c	10.00		
Woonsocket.....	*43,496	Br.	No	No	2,800,000	65	Yes	4,500	4,200	93	28c	9.3c	10.00		
SOUTH CAROLINA															
Abbeville.....	.....	Cr.	Yes	No	200,000	.....	No	498	412	83	20c	6c	\$6.00
Anderson.....(P)	*10,535	Ri.-Cr.	Yes	No	750,000	71	Yes	1,500	1,495	100	25c	15c	None		
Bishopville.....	500	W.	No	No	125,000	250	No	298	250	84	40c	25c	6.00		

Municipality	Population	Source of Supply	Filtered	Sterilized	Consumption		Metered at Pump	Number of Services	Number of Meters	% Metered	Meter Rates			
					Average Daily	Per Capita					Domestic Highest per 1,000 gal	Lowest Commercial per 1,000 gal	Minimum Annual Charge	
S. C.—(Continued)														
Camden.....	4,000	Cr.	Yes	No	225,000	56	No	750	550	73	35c	15c	\$9.00	
Charleston.....	*67,937	Imp.	Yes	Chl	6,600,000	97	Yes	8,400	8,250	98	24.7c	6c	12.00	
Cheraw.....	3,150	Ri.	Yes	Hyp	110,000	35	No	220	220	100	37c	15c	13.32	
Chester.....	5,600	Cr.	Yes	No	600,000	107	No	700	500	72	40c	8.5c	7.20	
Denmark.....	5,621	W.	No	No	35,000	6	No	120	120	100	40c	15c	24.00	
Greenwood.....	8,703	W.	No	No	500,000	58	No	1,200	1,000	83	13.5c	8c	6.00	
Greer.....	3,000	W.-Sp.	No	No	125,000	42	No	425	425	100	25c	10c	12.00	
Manning.....	2,800	W.	No	No	75,000	27	Yes	250	250	100	80c	15c	None	
Orangeburg.....	7,500	W.	No	No	350,000	47	No	900	600	67	25c	17.5c	6.00	
St Matthews.....	1,800	W.	No	No	75,000	42	No	190	175	92	30c	20c	12.00	
SOUTH DAKOTA														
Carthage.....	700	W.	No	No	45,000	64	No	130	120	92	50c	20c	.....
Mitchell.....	8,500	W.	No	No	500,000	59	No	1,400	1,400	100	26.7c	13.3c	\$6.00	
Sioux Falls.....	25,176	W.	No	Chl	4,500,000	99	No	4,500	4,190	93	40c	13.3c	9.00	
Watertown.....	10,000	L.	No	No	500,000	50	No	1,450	420	29	25c	10c	8.00	
TENNESSEE														
Clarksville.....	8,500	Ri.	Yes	Chl	750,000	87	No	1,250	700	56	35c	10c	\$12.00	
Dyersburg.....	7,000	W.	Yes	Chl	500,000	72	Yes	950	950	100	25c	15c	6.00	
Franklin.....	3,500	Sp.	No	No	100,000	3	No	806	625	78	30c	10c	12.00	
Jackson.....	*18,860	W.	No	No	2,500,000	133	Yes	5,000	216	4	18c	9c	.....
Knoxville.....	*77,818	Ri.	Yes	.....	900,000	11	No	14,921	14,921	100	18c	19c	10.08
Memphis.....	*162,351	W.	No	Chl	15,500,000	96	Yes	27,718	21,821	79	33.3c	12c	12.00	
Murfreesboro..... (P)	5,500	Sp.	Yes	Chl	450,000	82	No	1,000	600	60	40c	15c	.....
Nashville.....	*118,342	Ri.	No	Chl	14,000,000	118	No	24,000	20,000	83	18.7c	8c	6.00	
TEXAS														
Amarillo..... (P)	*15,494	W.	No	No	770,000	50	.....	2,800	3,260	100	50c	40c	\$18.00
Austin.....	*34,876	Ri.	Yes	Chl	5,268,591	151	No	6,340	6,340	100	20c	10c	6.00	
Brady.....	3,500	Cr.	Yes	.....	Unknown	.....	No	532	350	66	\$1.75	30c	21.00
Brownsville.....	13,163	Ri.	Yes	Chl	1,000,000	76	No	1,500	1,200	80	30c	12.5c	.....
Brownwood.....	8,223	Cr.	.....	No	750,000	91	No	1,000	1,000	50	20c	20c	9.00
Bryan.....	6,295	W.	No	No	160,000	26	Yes	900	900	100	75c	25c	.....
Cleburne.....	18,000	W.	No	No	750,000	42	Yes	3,500	3,100	89	25c	20c	Varies	
Commerce.....	3,850	W.	No	.....	160,000	42	.....	800	100	13	50c	20c	12.00
Crockett.....	5,000	W.	.....	.....	.....	.....	Yes	3 5	365	100	25c	18c	1.50
Dallas.....	*158,977	W.-Res.	Yes	No	9,000,000	58	No	29,813	29,813	100	25c	25c	.....
Dennison.....	*17,067	Imp.	Yes	.....	2,000,000	117	Yes	4,265	3,160	74	50c	10c	6.00
El Paso.....	*77,543	W.	No	No	7,000,000	90	Yes	12,000	10,000	83	27.5c	20c	15.00	
Ennis.....	8,000	W.	No	No	300,000	38	No	1,020	200	20	40c	12c	9.60	
Fort Worth.....	*106,482	L.	Yes	Chl	8,500,000	80	No	19,000	18,500	98	60c	30c	13.80	
Galveston.....	*44,255	W.	.....	Chl	3,830,000	87	No	8,786	9,000	100	26.7c	12c	3.00
Greenville.....	14,000	Imp.	Yes	Chl	750,000	54	No	1,700	350	21	30c	15c	9.00	
Jacksboro.....	1,600	W.	No	No	44,000	28	No	275	250	91	\$1.75	90c	.....
Longview.....	5,713	Ri.	Yes	Chl	250,000	44	Yes	600	600	100	45c	12c	15.00	
McKinney.....	8,000	W.	No	No	150,000	19	Yes	1,275	1,275	100	40c	35c	9.00	
Nacogdoches.....	6,000	W.	.....	.....	200,000	33	No	450	450	100	40c	20c	9.00
Orange..... (P)	10,000	W.	No	No	1,000,000	100	Yes	1,081	1,289	84	30c	20c	12.00	
Pecos.....	2,500	W.	No	No	15,000	6	No	30	30	100	80c	30c	.....
Port Arthur.....	*22,251	W.	No	No	450,000	20	Yes	2,849	2,849	100	30c	13c	6.00	
Quanah.....	4,000	W.	No	.....	40,000	10	No	375	360	96	\$1.00	50c	12.00
Rosenberg.....	2,000	W.	No	No	75,000	38	No	225	150	67	40c	10c	.....
San Saba.....	2,000	Sp.	No	No	100,000	50	No	250	100	40	50c	20c	2.00	
Sealy..... (P)	2,200	W.	No	No	70,000	32	No	210	12	6	50c	12c	21.00	
Sherman.....	*15,031	W.	No	No	800,000	53	No	3,510	3,150	100	50c	30c	6.00	
Smithville.....	4,000	W.	No	No	Unknown	.....	No	600	600	100	30c	15c	1.25
Stamford..... (P)	3,004	Res.	No	No	600,000	200	No	800	560	70	60c	15c	18.00	
Sweetwater.....	7,500	L.	.....	Chl	Unknown	.....	No	900	900	100	20c	.....	16.80
Teague.....	4,000	W.	No	.....	425,000	106	No	725	225	31	25c	18c	18.00
Temple.....	*11,033	Ri.	Yes	Chl	1,750,000	159	No	2,400	2,400	100	62.5c	10c	2.00	
Waco.....	38,500	W.-Ri.	Yes	Chl	3,750,000	98	Yes	10,000	6,750	68	37.5c	6c	9.00	
Waxahachie.....	7,200	W.	No	No	500,000	70	Yes	1,400	1,400	100	40c	10c	9.00	
Weatherford..... (P)	6,302	W.	No	Chl	200,000	32	No	810	650	80	50c	25c	12.00	
Yoakum..... (P)	7,500	W.	No	.....	51,000	68	No	1,600	550	34	33c	30c	1.10
UTAH														
Salt Lake City.....	*118,110	St.	No	No	26,000,000	220	No	22,638	7,336	32	7.3c	6c	\$6.00	
VERMONT														
Bristol.....	1,200	Sp.	No	No	90,000	75	No	300	5	2	None	6c	None	

Municipality	Population	Source of Supply	Filtered	Sterilized	Consumption		Metered at Pump	Number of Services	Number of Meters	% Metered	Meter Rates				
					Average Daily	Per Capita					Highest Domestic per 1,000 gal.	Lowest Commercial per 1,000 gal.	Minimum Annual Charge		
VERMONT—(Cont.)															
Burlington.....	*22,779	L.	Yes	Hyp	1,416,228	62	.....	3,967	4,000	100	20c	8c	\$6.00	
Essex Junction.....	1,500	Sp.	No	No	Unknown	.....	No	450	200	45	30c	6c	9.00	
Fairhaven.....	3,000	P.	No	No	50,000	17	No	500	10	2	25c	10c	2.50		
Morrisville.....	1,600	Sp.	No	No	150,000	94	No	650	15	2	20c	8.7c	None		
Northfield.....	.....	Sp.	No	No	Unknown	.....	.....	450	240	53	37.3c	13.3c	8.00
Richford.....	2,000	Sp.	No	No	100,000	50	No	350	4	1	20c	6.7c	.....	
White River Junc... (P)	2,500	Sp.	No	No	200,000	80	No	500	50	10	25c	6c	13.00		
VIRGINIA															
Alexandria..... (P)	18,060	Ri.	Yes	Chl	1,600,000	89	Yes	390	150	39	30c	8c	12.00		
Danville.....	25,000	Ri.	Yes	Chl	1,800,000	72	No	4,600	4,600	100	10c	10c	6.00		
Emporia.....	2,750	Ri.	Yes	Chl	300,000	109	No	350	350	100	20c	5.5c	12.00		
Fredericksburg.....	7,000	Ri.	No	Chl	1,000,000	143	No	1,400	42	3	20c	2c	8.00		
Hampton..... (P)	7,800	Res.	Yes	Chl	2,500,000	321	Yes	1,800	1,063	59	29.3c	10.7c	16.00		
Lynchburg.....	*29,956	Ri.	Yes	Chl	6,000,000	200	.....	6,600	400	6	23.8c	8c	.....	
Martinsville.....	4,200	Cr.	Yes	Chl	200,000	48	No	750	325	43	15c	10c	13.20		
Richmond.....	*171,667	Ri.	No	Chl	16,314,877	95	No	33,627	24,944	74	13.5c	5c	7.20		
Shenandoah.....	1,500	Ri.	Yes	No	450,000	300	No	375	50	13	10c	10c	9.00		
WASHINGTON															
Bellingham.....	*25,570	.....	No	Chl	5,000,000	196	No	7,000	1,400	20	33.3c	5.3c	\$12.00	
Chehalis.....	5,000	Ri.	No	No	800,000	160	No	1,100	130	12	22.5c	5c	12.00		
Ellensburg.....	5,500	W.	No	No	1,662,260	303	Yes	792	186	24	13c	8c	12.00		
Hoquiam..... (P)	10,042	St.	Yes	Chl	3,000,000	300	Yes	2,240	1,200	54	40c	8c	15.00		
Ione..... (P)	650	Cr.	No	No	Unknown	.....	No	170	20	12	50c	5c	18.00	
Kent.....	3,000	Sp.	No	No	240,000	80	No	850	200	24	\$1.70	\$1.25	12.00		
Olympia.....	9,500	Sp.-W.	No	Chl	500,000	53	No	1,800	1,475	82	35c	15c	None		
Omak.....	500	Ri.	Yes	No	100,000	20	No	130	60	46	26.7c	10c	24.00		
Oroville.....	1,000	W.	No	No	200,000	200	No	250	10	4	20c	11c	.....	
Port Townsend.....	3,500	St.	No	No	350,000	100	No	764	63	8	50c	14c	18.00		
Pullman.....	3,400	A. W.	No	No	200,000	59	No	800	800	100	\$2.25	10c	12.00		
Seattle.....	*315,652	Ri.	No	Chl	35,000,000	111	No	52,600	52,600	100	13.3c	5.3c	6		
Spokane.....	*104,437	W.	No	No	23,000,000	220	Yes	26,211	22,025	84	10c	5c	9.60		
Sunnyside.....	2,000	W.	No	No	250,000	125	No	467	467	100	36c	12c	18.00		
Tacoma.....	*96,965	Ri.	No	Chl	23,000,000	237	No	19,500	1,740	9	13.3c	5.3c	6.00		
Waitsburg.....	1,200	Sp.	No	No	160,000	133	No	300	290	97	26.7c	10.7c	12.00		
Walla Walla.....	20,000	St.	No	Yes	5,000,000	250	No	4,050	1,300	32	20c	8c	9.00		
Winlock..... (P)	1,220	W.	No	No	100,000	82	No	209	75	36	58.3c	20c	.....	
Zillah.....	700	W.	No	No	35,000	50	No	141	2	1	\$1.33	\$1.33	3.00		
WEST VIRGINIA															
Berkeley Springs... (P)	1,800	Sp.	No	No	98,000	55	No	253	74	29	30c	.....	.....
Charleston..... (P)	*39,608	Ri.	Yes	Chl	6,000,000	152	Yes	8,500	1,500	18	30c	11c	\$12.00		
Clarksburg.....	*27,869	Ri.	Yes	Hyp	5,000,000	180	No	4,800	350	7	35c	10c	9.00		
Huntington..... (P)	*50,177	Ri.	Yes	Chl	3,500,000	70	No	9,300	9,300	100	20c	7.5c	9.00		
Morgantown..... (P)	*12,117	Ri.	Yes	No	1,500,000	124	No	2,244	150	7	30c	10c	12.00		
Sisterville.....	3,338	Ri.	Yes	No	750,000	23	No	1,000	23	3	35c	5c	None		
Weston..... (P)	5,000	Ri.	Yes	Chl	500,000	100	No	750	500	67	40c	10c	6.00		
Wheeling.....	*54,322	Ri.	No	Chl	16,225,000	297	No	11,000	96	9	15c	5c	.....	
WISCONSIN															
Appleton.....	*19,561	Ri.	Yes	No	2,000,000	102	Yes	3,100	3,250	100	26.7c	4.7c	\$3.00		
Bayfield.....	2,100	L.	No	Chl	140,000	67	.....	396	90	23	40c	15c	9.00	
Chilton.....	2,000	W.	No	No	70,000	35	No	165	128	78	50c	10c	7.00		
Clinton.....	1,000	W.	No	No	80,000	80	Yes	220	107	49	30c	30c	6.00		
Cudahy.....	6,500	L.	No	Chl	700,000	108	No	950	950	100	8c	8c	1.20		
Delavan.....	2,800	Sp.	No	No	100,000	36	No	600	600	100	24c	16c	.....	
Fond du Lac.....	*23,427	W.	No	.....	1,500,000	64	Yes	4,850	4,000	83	40c	15c	None	
Fort Atkinson.....	5,000	W.	No	No	450,000	90	No	1,000	988	99	10.7c	4.7c	3.00		
Janesville.....	*18,293	W.	No	No	2,200,000	120	No	3,200	1,600	50	23.3c	2.7c	7.00		
Kaukauna.....	6,000	W.	No	No	225,000	38	Yes	785	730	93	30c	9c	5.00		
Kenosha.....	*40,472	L.	Yes	Chl	6,000,000	149	Yes	5,800	5,800	100	16c	6c	6.00		
La Crosse.....	*30,363	W.	No	No	3,000,000	100	Yes	6,200	5,500	89	20c	4c	.....	
Lake Geneva.....	3,500	A. W.	No	No	150,000	43	No	600	580	97	35c	10c	10.00		
Lake Mills.....	1,750	W.	No	No	200,000	114	Yes	324	320	99	25c	5c	6.00		
Madison.....	*38,378	W.	No	No	4,000,000	104	Yes	7,402	7,377	99	10c	5.3c	4.00		
Menomonee.....	5,200	W.-Ri.	.....	Chl	500,000	96	Yes	1,100	520	47	30c	5c	10.80	
Merrill..... (P)	9,000	Ri.	Yes	No	Unknown	.....	No	.....	.....	.....	44c	11c	13.20
Merrillan.....	650	W.	No	No	20,000	31	No	70	11	16	30c	30c	6.00		
Milwaukee.....	*457,147	L.	No	Chl	61,891,603	136	Yes	66,422	65,769	99	8c	6c	None		
Mineral Point.....	3,000	W.	Yes	No	30,000	10	No	270	270	100	50c	20c	5.00		
Onalaska.....	1,200	W.	No	No	153,700	128	Yes	241	96	40	20c	4c	5.50		

Municipality	Population	Source of Supply	Filtered	Sterilized	Consumption		Metered at Pump	Number of Services	Number of Meters	% Metered	Meter Rates			
					Average Daily	Per Capita					Highest Domestic per 1,000 gal.	Lowest Commercial per 1,000 gal.	Minimum Annual Charge	
WISCONSIN—(Cont.)														
Oregon.....	1,000	W.	No	No	10,000	10	No	120	8	7	4c	3c	\$6.00	
Reedsburg.....	3,500	W.	No	No	235,000	82	Yes	750	776	100	8c	6.9c	6.00	
Ripon..... (P)	5,000	Sp.	No	No	500,000	100	Yes	1,000	250	25	25c	8c	7.00	
Sparta.....	5,000	W.	No	No	350,000	70	No	620	620	100	24.5c	4.7c	.....
Stevens Point..... (P)	*11,370	Ri.	Yes	Hyp	1,200,000	106	Yes	1,169	567	49	34.7c	6c	10.00	
Superior..... (P)	*39,624	W.	Yes	No	2,700,000	68	Yes	6,686	6,761	100	40c	6c	9.00	
Watertown.....	10,000	W.	No	No	746,376	75	Yes	1,700	1,619	95	21.3c	5.7c	5.00	
Wausau.....	*18,661	W.	No	No	1,000,000	107	No	3,200	2,000	63	30c	6c	5.00	
Wanawata.....	5,000	A. W.	No	No	500,000	100	Yes	1,624	1,050	65	9.3c	9.3c	3.00	
Wisconsin Rapids.....	8,000	W.	No	No	570,000	71	No	1,400	1,400	100	64c	8c	.....
WYOMING														
Pine Bluffs.....	900	W.	No	No	60,000	67	No	175	175	100	30c	10c	None	
Rock Springs..... (P)	6,750	Ri.	Yes	Chl	600,000	89	No	1,200	1,100	92	\$1.50	40c	\$18.00	
Thermopolis.....	3,000	W.	No	No	Unknown	.....	No	500	425	85	30c	15c	12.00
CANADA														
ALBERTA														
Bassano.....	1,200	Ri.	No	Chl	180,000	150	Yes	120	90	75	50c	10c	\$20.00	
Red Deer.....	2,500	Ri.	No	No	250,000	10	No	316	6	2	15c	10c	12.00	
BRITISH COLUMBIA														
Kamloops.....	5,000	Ri.	No	No	1,000,000	200	Yes	1,100	4	1	None	8c	None	
MANITOBA														
East Kildonan.....	5,000	L.	No	Chl	30,000	6	Yes	340	340	100	27c	27c	6.00	
NEW BRUNSWICK														
St. John.....	60,000	L.	No	No	15,000,000	250	No	7,236	400	6	None	5c	12.00	
St. Stephen.....	3,000	W.	No	No	500,000	167	No	750	78	10	30c	5c	20.00	
Woodstock.....	4,500	Ri.	Yes	No	400,000	91	Yes	700	300	43	45c	13c	10.00	
NEWFOUNDLAND														
St. Johns.....	32,000	L.	No	No	5,000,000	156	Yes	4,200	10	1	7c	7c	.....
NOVA SCOTIA														
New Glasgow.....	11,000	L.	No	No	2,500,000	227	Yes	2,000	75	4	30c	3c	10.00	
Sydney.....	27,000	Imp.	No	.....	3,043,980	113	.....	2,935	28	10	25c	10c	8.00
ONTARIO														
Aurora.....	2,300	W.	No	No	150,000	65	Yes	600	2	1	Flat	7c	.....
Brampton.....	4,328	L.-W.	Part	No	450,000	104	No	1,050	960	91	35c	9c	9.60	
Brantford.....	32,700	Sp.	No	Chl	3,600,000	110	Yes	7,200	2,654	37	35c	9c	4.00	
Cobourg.....	5,000	L.	Yes	No	800,000	160	Yes	1,000	200	20	35c	8c	12.00	
Dundas.....	5,000	Sp.-Cr.	Yes	Chl	480,000	96	Yes	640	420	66	48c	16c	12.00	
Elmira.....	2,500	W.	No	No	7,500	30	No	350	60	17	30c	11c	10.00	
Guelph.....	17,032	Sp.	No	No	2,500,000	147	No	3,847	68	2	25c	10c	10.00	
Ingersoll.....	5,000	Sp.	No	Chl	750,000	150	No	1,035	300	29	25c	7c	5.00	
Kitchener.....	22,000	W.	No	No	2,000,000	91	Yes	4,261	3,556	94	23c	9c	5.90	
London.....	60,000	W.-Sp.	No	No	6,000,000	100	Yes	16,807	5,396	32	16.8c	8.3c	10.00	
Niagara Falls.....	14,307	Ri.	Yes	Chl	3,500,000	245	Yes	3,378	42	1	12c	6c	\$4.00	
Orillia.....	8,000	L.	Yes	Chl	690,000	86	Yes	1,650	48	3	26c	8c	.....
Ottawa.....	112,000	Ri.	No	Chl	21,500,000	192	Yes	25,300	400	2	.....	13c	.....
Owen Sound.....	13,000	Sp.-Ri.	Yes	No	1,500,000	116	Yes	3,220	15	5	.....	.....	.....
Parry Sound.....	4,500	B.	No	No	300,000	67	No	900	15	2	35c	15c	.....
Peterborough.....	22,000	Ri.	No	Chl	3,100,000	141	Yes	4,660	82	2	13.9c	9.3c	4.00	
Preston..... (P)	5,000	Sp.	No	No	275,000	55	No	580	580	100	.....	.....	.....
Ridgeway.....	2,200	W.	No	No	45,000	20	No	450	12	3	30c	30c	5.00	
Simcoe.....	4,010	Sp.	No	No	237,600	59	No	950	670	71	16.7c	5.6c	6.00	
St. Catharines.....	22,000	L.	No	Chl	5,700,000	259	No	5,500	300	5	19.2c	4.6c	10.00	
Thorold.....	4,000	C.	No	Chl	600,000	150	Yes	900	10	1	20c	5c	.....
Toronto.....	499,278	L.	Yes	Chl	62,490,000	125	No	104,766	3,566	3	13.8c	13.8c	None	
Walkerville..... (P)	11,000	Ri.	No	Chl	3,330,000	330	No	2,400	290	11	8.3c	6.3c	8.00	
Wallaceburg.....	5,000	Ri.	Yes	Chl	150,000	30	Yes	900	520	55	24c	16c	6.00	
Whitby.....	3,500	L.	Yes	Hyp	500,000	143	No	630	80	13	16c	7c	10.00	
Woodstock.....	10,000	Sp.	No	No	1,521,600	152	Yes	2,600	110	4	15c	6c	8.00	
P. E. ISLAND														
Charlottetown.....	12,000	W.	No	No	1,500,000	125	No	2,400	50	2	30c	15c	20.0	
QUEBEC														
Montreal.....	694,000	Ri.	Yes	No	15,000,000	22	Yes	85,000	1,668	2	12.8c	Spec.	.....
Quebec.....	120,000	L.	No	No	13,500,000	112	No	11,000	45	1	60c	25c	.....
River du Loup.....	7,000	Ri.-L.	No	No	1,250,000	179	No	1,500	5	1	25c	8.5c	7.00	
SASKATCHEWAN														
Moose Jaw.....	22,500	W.	Yes	Chl	890,000	40	Yes	2,362	2,362	100	80c	16c	18.00	

Pittsburgh's Playgrounds and Citizens Committee on City Plan

By Frederick Bigger

Executive Secretary of the Citizens' Committee

THE Citizens Committee on City Plan of Pittsburgh is an unofficial body of private citizens who believe that a definite and workable program of development is even more necessary for the city of Pittsburgh, in its business, than for any individual Pittsburgher in his business or profession.

The committee was organized with the single object of producing the Pittsburgh Plan, to give Pittsburgh an orderly, scientific, comprehensive program of city building. The committee has no political connections and no partisan purposes. It is financing its own program of planning. Since it came into existence, late in 1918, there has been renewed interest in city planning. The official City Planning Commission, which had about ceased to receive adequate municipal and public support, has taken a new lease of life. It is believed that any part of the planning work which the official Commission will undertake to do adequately, and for which it will receive proper support, should be done by that body, thereby relieving the Citizens Committee of such portion of its program.

It should be understood that the planning studies which are being made have specifically to do with the physical development of the city. Necessarily this development can only be properly understood and planned for when the social and economic factors have been studied.

The City's Present Recreational Facilities

Take, for example, the first portion of the Committee's work—its report upon Pittsburgh's playground. This study does not attempt to cover all the recreation problems of the city. It covers only the playground system, together with special sites for athletics. It is a general study only, designed to show the needs of the children and youth of the various parts of the city, and to formulate a policy which the city may wisely follow in supplying those needs.

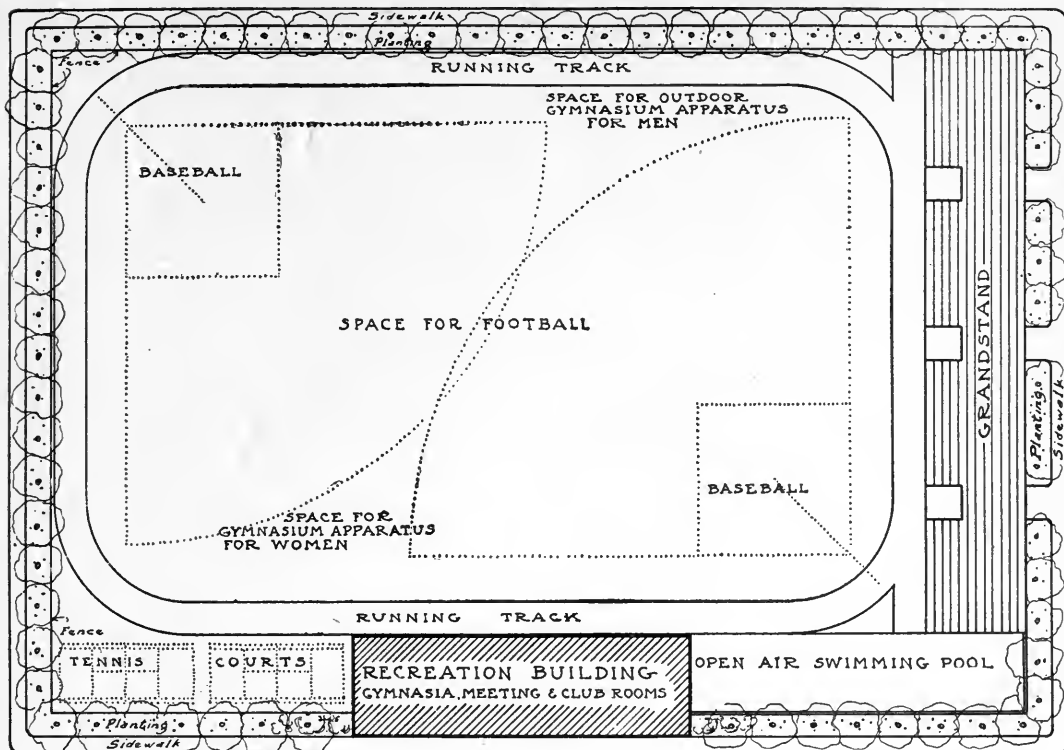
Recreation work and facilities in Pitts-

burgh are now in charge of the City Bureau of Recreation, the City Bureau of Parks (both in the Department of Public Works), the Bureau of Police of the Department of Public Safety, the North Side Playground Association (a private body receiving both private subscriptions and municipal appropriations), the Pittsburgh Board of Education, various social agencies (settlement houses) and industrial corporations. The Citizens Committee on City Plan believes the time is here when proper unification of the work of these groups should be undertaken.

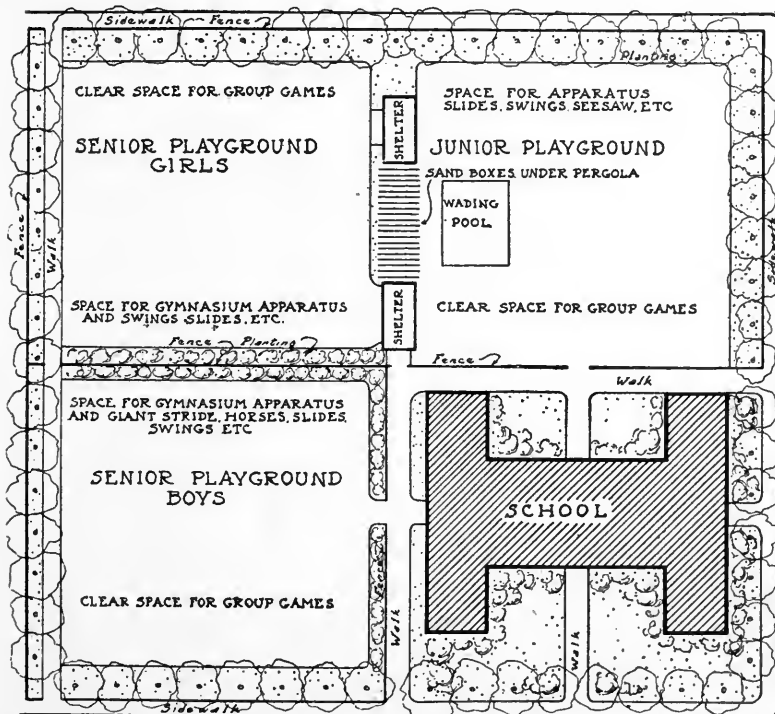
It is true that commendation may be given to certain details of playground plant and administration in Pittsburgh. It is equally true that comparisons are odious, that it matters less whether Pittsburgh's playgrounds compare favorably or unfavorably with those of other cities than it matters whether Pittsburgh's plant is adequate to meet its needs. Therefore it has seemed necessary to ascertain the truth and face it, no matter how unpleasant, rather than to dress it up into a more palatable statement.

The purpose of the present study of playgrounds has been the planning for the coördination of all the physical facilities into a system so adjusted to the city plan as to assure the best service to the people, and economy of ultimate unified administration. The study is technical—or at least semi-technical. It has aimed to produce facts and to make common-sense deductions from those facts. It is therefore as far as possible removed from being the expression of personal opinion or group opinion. The report indicates a sane, businesslike, and efficient program for the acquisition and development of playground areas. In so far as it does this its emphasis falls upon efficient technical administration of a constructive, progressive program for part of the city-building process.

The Citizens Committee believes that, although the correct detailed development of individual playground areas is important, the question of general policy is of vital import



ATHLETIC FIELD CENTER



POSSIBLE
ARRANGEMENT
OF DIFFERENT
TYPES OF
PLAYGROUND
ON
MINIMUM
SIZE PLOTS
OF GROUND

0 50 100
SCALE IN FEET.

in assuring that result. Therefore we have placed at the very beginning of our report the following general recommendations:

Recommendations

"Playground activities and all other forms of public recreation should be administered by one agency, preferably by a City Department of Recreation. Particular attention should be given to the adjustment of playground activities to the school curriculum. As a step toward this accomplishment, and in order to meet present needs, a working agreement should be effected by the Bureau of Recreation, the Bureau of Parks, the Board of Education, and the North Side Playground Association whereby a unified program of year-round playground activity may be developed. The following points should be covered:

"1. The dedication or allotment of the necessary grounds for playground purposes should be made by the city and the Board of Education.

"2. The city and the Board of Education should adjust their obligations so that the purchase of additional grounds may be effected by either or both.

"3. The program of development given in this report should be adopted and, from time to time as funds are available, extensions and improvements should be made. Whenever possible this should be done in order of urgency, undertaking projects at the top of the list. The question of purchase of sites versus development of grounds should be carefully considered.

"4. A complete topographic map, and a plan for ultimate development based thereon, should be prepared by the city for all playgrounds. (The Board of Education should furnish topographic maps of all its playground properties.) No site can justly be called a playground until at least the grading and enclosure are completed.

"Whenever a property of rough topography or of considerable variation in grade is considered for purchase, a sketch plan of possible development based upon an accurate topographic survey, together with an estimate of the cost of grading, should be made before purchasing the land. It should not be forgotten that financially the important point is the cost of usable land and not necessarily the purchase price of the site.

"5. The development of each playground should be undertaken progressively, and no permanent construction whatever should be made in any playground or park until after the plan of ultimate development of that ground has been drawn up and officially adopted.

"6. Early development of athletic field centers should be made. These are especially important, inasmuch as the facilities there provided will in a large measure meet the need now evidenced by the demand for baseball grounds. At such places the development of community centers will be particularly effective in arousing local interest and spirit which may be ex-

pressed in inter-community contests, games and pageants.

"7. The Bureau of Parks should be charged with the installation and maintenance of the parking and planting of all city-owned playgrounds, and the playgrounds upon school property might be included. Care of the play space and buildings should of necessity be the responsibility of the operating agency.

"8. All playgrounds having enough space for baseball diamonds should have facilities for spraying the grounds in winter to provide ice for skating.

"9. At all playgrounds a daily record should be kept of the attendance (visits) of boys and girls under ten years of age, boys over ten, and girls over ten. In order that there shall be no discrimination in service, it is desirable that a separate record of negro children be kept. The place of residence of all children who are regular attendants should be recorded. Such records, heretofore incompletely kept, will be the public's measure of service rendered by the playgrounds, and will be invaluable in determining any need for change in character of activity or for extension of facilities.

"10. An adjustment of personnel should be made so that properly qualified supervisors, directors and play leaders, employed by the city or by the Board of Education, may be most efficiently engaged without regard as to whether one or the other agency pays the salary. This will permit of adjustment of playground work to educational work and will prevent duplication of effort.

"11. If the playgrounds are not open on Sunday for organized play, there should in any case be official supervision of the children and youth who will inevitably congregate upon these grounds.

"Only when public opinion has become strong enough to demand the execution of a unified playground program such as is here recommended, to the exclusion of selfish interests, can there be assured economical and efficient expenditure of public funds for development and administration."

In the way of specific recommendations the Committee has tabulated more than one hundred recommendations as to individual playgrounds and athletic field sites, which when properly developed will constitute a system giving adequate service to every section of the city. These recommendations have been listed in the order of their urgency as determined by factors such as general and school population, service rendered by existing recreational centers, juvenile delinquency statistics and the like. The plan suggested by the Committee is that when money is available, as many items as possible be taken from the top of the list of recommendations so that the most urgent needs may be met first of all. The Commit-



THE PRESCRIPTIONS OF THE CITIZENS COMMITTEE WILL HELP FATHER PITT TAKE ON WEIGHT

tee suggests the re-rating of the playground areas every three to five years in order to meet the changing conditions in various sections of the city.

Special emphasis is placed by the Committee on the need for all-year-around services by the playgrounds. "If a city is at all justified in expending money for playground purposes," the report reads, "that expenditure should be made in accordance with the need to be met, and not merely for supplying something that can be used only two or three months out of the twelve. If recreation is needed at all, it is needed all

the time. Consequently, the playgrounds should either be located next to the school or should be provided with proper buildings."

As examples of what may be done to properly arrange and develop playgrounds and athletic field sites, the Committee has included in its reports drawings showing possible arrangements of such sites, and in conjunction with the Pittsburgh Architectural Club has conducted a competition to obtain suggestions for the future development of one of the larger grounds for recreational purposes.

On the Calendar of Conventions

JANUARY 19-20, 1921.—NEW YORK CITY.
American Society of Civil Engineers. Secretary, Charles Warren Hunt, 33 West 39th Street, New York, N. Y.

JANUARY 26-28, 1921.—PHILADELPHIA, PA.
American Society of Heating and Ventilating Engineers. Secretary, C. W. Obert, 29 West 39th Street, New York, N. Y.

FEBRUARY 1-3, 1921.—TORONTO, ONT.
Engineering Institute of Canada. Secretary, Fraser S. Keith, 176 Mansfield Street, Montreal, Que.

FEBRUARY 3-5, 1921.—OAKLAND, CALIF.
California Association of Commercial Secretaries. Secretary, Charles P. Bayer, Secretary of Chamber of Commerce, Pomona, Calif.

FEBRUARY 9-12, 1921.—CHICAGO, ILL.
American Road Builders' Association. Secretary, E. L. Powers, 11 Waverly Place, New York, N. Y.

FEBRUARY 25-26, 1921.—HARRISBURG, PA.
Pennsylvania Commercial Secretaries' Association. Secretary, E. J. Fellow, Chamber of Commerce, Lebanon, Pa.

The National Child Labor Committee has announced that Child Labor Day will be observed Saturday, January 22, in synagogues; Sunday, January 23, in churches, and Monday, January 24, in schools. The National Child Labor Committee has prepared a special pamphlet for the use of leaders of meetings on that day and posters to announce such meetings. These, with other publications of the committee, may be obtained on application to its office, 105 East Twenty-second Street, New York City.

The Crime Epidemic and the Motor-Cycle as a Remedy

IN an interesting editorial, the *New York Sun* comments as follows upon the outburst of crime which has shaken a great portion of this country:

The epidemic of crime or wave of crime, or whatever it be called—the great prevalence of crime—is not due, we imagine, to any new access of depravity in the community. There are no more criminals than at any other time, nor are these criminals morally worse than in tamer periods. The condition, which has developed something approaching a panic among honest folk, has been due to a broad general confidence in the criminal classes that they can do what they please and “get away with it.”

They have gradually ceased to be afraid of the police for the last two years or so, as they have seen crime after crime slip into the past unsolved and unpunished. This is the whole situation in a nutshell. If there shall be a change of form on the part of the police, and murderers, burglars and highwaymen are caught as fast as they raise their heads, the wave of crime will subside at once.

This is the necessary, the imperative thing. The police must function in order to restore normal conditions. Crime can never be stopped altogether; but the rogues and the ruf-

fians can be driven back to trivial assaults and petty larceny. These minor offenses are the natural activities of the semi-degenerate gangsters, who are now doing sensational stunts with much “gun play” because of the immunity which they deduce from the record of the police and detective performances.

The accompanying illustration shows a patrol recently placed on Route 131 of the Pennsylvania state highway system to safeguard motorists who travel over that important highway thoroughfare from New York to Washington. Many hold-ups had made this route dangerous, but the men from Troop E, Lancaster, Pa., who carry a plentiful supply of ammunition, have made the road safe, and criminals are now giving it a wide berth.

This mode of protection may well be applied by other cities in patrolling streets and highways. Well-mounted and well-armed, constables, troopers or policemen, as the case may be, acting in pairs or squads, can by the use of the motor-cycle largely eradicate hold-ups from our thoroughfares.



Photograph by C. H. Thomas, Kennett Square, Pa.

MOTOR-CYCLE PATROL ON PENNSYLVANIA HIGHWAY BETWEEN NEW YORK AND WASHINGTON

Winter Sports in Our City Parks

By S. R. DeBoer

Landscape Architect

THE time was when to be a good park man it was sufficient to be a good florist. Those were the days of "Keep off the grass" signs. The signs have disappeared, and with them has disappeared the old character of the park superintendent's work. Service has become his guiding motto. Beauty? Yes, but beauty in the service of the community. In addition to caring for his flowers, his shrubs and his trees, the park man has become the guardian of the happiness and health of the people he serves.

Outdoor Recreation Every Season of the Year

With this idea of service in park work has also come the realization of the necessity of giving people outdoor recreation, as far as possible, every season of the year. Winter sports fill a very important part in this recreation scheme. Much as it may be necessary to have people come out to the parks on the hot summer days, it is fully as essential to have them enjoy the invigorating winter air in the days of steam heat, of colds and "flu."

The war has changed our ideas of athletics; a little, at least. The colleges and universities are waking up. Where is the benefit to the growing body of your boy or my girl at college, to have a score of big huskies play a football game, or another set play a baseball game? The games on the corner lots were all right; there all the boys had valuable exercise. But in our schools and colleges athletics seem to affect the majority of students only in the lung exercise of cheering. I would be the last one to condemn this exercise, but as a general body builder it is rather one-sided. For the good of our boys—and of our girls—is it not about time that we reverse the tables and have two teams of eleven each on the bleachers as spectators, and the several hundred students as actual players, and therefore the beneficiaries of the sport?

The one way to judge the value of a sport to the community as a whole is to judge the number of actual players as compared with

the number of spectators. There are no spectators in skating, or nearly none; everybody skates. If the faces of the players are radiating health and cheerfulness, you get results; if they are gloomy, as professionals may look gloomy, you are wasting valuable effort and time. Look at the smiles, at the glowing cheeks of a crowd on skates.

How to Make a Skating Rink

A lake is a valuable asset for skating. No artificially made rink can compare with it. It needs less care, is more permanent and more satisfactory. Where there is at least two feet of water, good ice, once established, can be maintained much longer than on an artificially made rink. In the care of ice there is a great deal in an early beginning. As soon as the ice is strong enough to carry the men, it should be taken care of. The danger at this time especially, as it is at other times, is snow. The finest black ice, once covered with a blanket of snow, will lose its hardness, and unless the snow is removed before melting starts, will turn into the well-known gray-colored snow ice. The snow melts into the ice, and the crust of it freezes over again. Careful planing and cleaning may gradually make this crust usable again, but it never regains the hardness of the original ice. The first day of thaw it will soften and become useless.

If the weather stays sufficiently cold, this snow ice can still be improved upon by flooding, or, better, by spraying at night. Flooding must be done rather judiciously, for fear that the flooded area will not knit together with the ice under it and shell ice be formed, which is soon cut through by the skater. Cracks should be filled with hot water, which better knits together with the existing ice than cold water.

On places where natural lakes do not exist, artificial rinks can be made. Probably no places on the globe have developed the science of making artificial rinks as highly as have the mountain resorts of Switzerland. "Winter Sports in Switzerland," by E. T. Benson, contains valuable information



EVERY YEAR MORE CITIES ARE APPRECIATING THE POSSIBILITIES OFFERED BY THEIR PARKS FOR WINTER RECREATION

on this subject, as on all other winter sports, and will convince one that to talk about the science of making a rink is not to overstate the undertaking. A good article on ice skating rinks, by George H. Browne, was published in *Landscape Architecture* for January, 1916.

In Switzerland the ground for the rink is leveled off in spring. Weeds may be allowed to grow over it during the summer, as the roots help to form the foundation which is necessary for building up a rink. As soon as snow falls, this is heavily tramped on the rink by men, until a well-compacted mass of snow 4 inches thick has been formed. This is sprinkled with water and freezes. If no more snow falls for a time, the rink can be built on this foundation, otherwise the snow will have to be tramped in again and everything done over.

Two inches of water is put on top of the snow on a sunny day. On a very cold day this water would freeze separately from the snow foundation and not knit together with it very well, but on a sunny day it will knit satisfactorily. Then for several nights one inch of water is put on the rink, until the ice is 18 inches thick. Snow followed by frost is easily cleaned off: But snow followed by thaw is serious. The ice thaws unevenly, making a number of small holes. Each of these holes should be filled by hand with a freezing mixture of snow and water, or, still better, with pounded ice and water. Every evening the dust of skating should be swept off.

Flooding should be done only when the sun shines, to allow the new ice to knit together with the existing ice. Sprinkling is much better, but often has to be done six or seven times a night.

Seepage is the great difficulty with artificial skating rinks and must be prevented at all costs if the rink is to be a success. Mr. Browne recommends a clay covering at the bottom of the rink to make the floor impervious to water. After a good foundation has been secured, everything depends on continuous sprinkling. Wait with the next sprinkling until the former one is frozen. Warm water is better than cold. With the thermometer 10 F., the best time to sprinkle is after sunrise, 7-8 A. M. Below 5 F., the frost will tear cracks in the ice. In general, the coldest weather, below zero, does not make the best ice, but it does make the ice that withstands thaw the longest.

Instruction in Skating—Skating Contests

Contests in the various games should be organized occasionally, and the superintendent of a rink should constantly keep in mind that contests are not for the benefit of the few participants nor even for the people watching them, but are simply the means of bring the attractions of the sport to the attention of a greater number of people. Contests for fast skating should be conducted on short tracks, which can be built in the same shape in which the race tracks for horses are built, only with this

difference—that the races are held on the inner part of the track and the public uses the place on which the horses would race, as a skating place around the inner track. Fancy skating contests, which often draw large crowds, are also best conducted this way. Prizes should be allowed the winners, to keep the interest of the players keen. Especially where boys and girls are entered in the races, prizes should be given, though they need not be expensive if proper judgment be used in their selection.

These affairs are best conducted by an experienced man who can also teach the various ice games and fancy strokes on skates. An instructor similar to the playground instructor would be valuable in this respect. For those who have not studied fancy skating, there is a surprise in store, for fancy skating is more or less of an art, or maybe a science, following well-defined lines.

No doubt skating is the most popular and the most valuable of our ice sports. But where there is plenty of ice, room should be put at the disposal of players of other games. For curling, the ice must be still smoother and harder than for skating. A curling rink should be 42 yards long and 8 or 9 yards wide, and tees should be placed at the ends of the rink, 38 yards apart. The game is played by eight persons, four on each side. A series of curling rinks can be made side by side and roped off to keep them separate from the skating rinks.

Hockey is a valuable game, that is played with a ball or puck of tough, seasoned cork, 3 inches in diameter and 1 inch thick. This is batted over the ice with a club. As a rule, the whole pool should be used for this game, and for this reason skating and hockey do not go together very well. On large lakes an area can be fenced off by boards a foot high, to keep the puck in the lines, and the rest of the lake can be used for other sports.

Buildings and Equipment

At places where large crowds are expected, and especially children, heated buildings should be provided to allow the people to warm and rest themselves. On a large lake where boating is a summer sport a permanent building may well be put up. With the lower floor near the water level, it can be used by the skaters as well as by the boaters.

The main room should be heated, preferably with hot water, to enable the caretakers to get hot water from the heating plant for sprinkling the ice. Where no central heating plant can be installed, a large stove will answer the purpose. A bucket of warm water will enable the skaters to clean their skates. The floor can be built of cement, but should be covered with two inches of sawdust during the skating season. A refreshment counter where drinks and light lunches can be had at reasonable cost should be included in such a building.

In Holland, where skating is the national winter sport and where in the winter all freight traffic, or a great deal of it, goes over the frozen canals, long excursions on skates are possible. To supply the skaters making these trips with refreshments, little tents are built at frequent intervals, in which warm milk and cake are sold.

The equipment of the skating pavilion should include an emery wheel, driven by an electric motor, for sharpening skates. A small charge can be made for this service, as otherwise the demand will become too heavy. Long ropes, for roping off races and the like, also for roping off dangerous places or places which should not be used temporarily, should be kept in the building. In addition to this, it is well to have a ladder handy in case of accidents caused by the breaking of the ice, and a first aid chest. The building should also include lavatories and a check room for overcoats and other clothes. Large public rinks should be well lighted at night. Many working people will not be able to come during the day and will appreciate skating by night.

Tobogganning—Bob-Sledding—Skiing

The Swiss mountain resorts probably also lead in tobogganning. Long toboggan roads are built there from a hilltop down to the valley. These roads are only a few feet wide, but are built mathematically correct. Grades are studied and curves calculated as carefully as in railroad engineering. The speed of toboggans going over these runs may be as high as 70 miles per hour. The turns are banked up with snow, which is tramped and sprinkled until frozen solid. One of these courses is 1,300 yards long and is covered in 60 seconds.

This sport may be valuable to the Swiss

resorts, for it draws crowds, but it is not the sport we like to encourage for our park visitors. There are too many spectators for the few actual runners. Besides, for inexperienced people these runs are dangerous. Greater benefits are derived from our children's tobogganning. Let them bring their sleds, and give them a place that is safe. Where there are no hills to be had, a scaffolding can be built with a run of snow and ice.

Denver has a rather unique opportunity for the kiddies. The parks do not have any slopes long enough for good sledding, so part of one of the main asphalted streets leading to a residence district is closed for traffic. The hill is over three city blocks long. Though the street is one of the main thoroughfares for that part of the city, no complaints are made of its being closed. The value of this hill in the street to hundreds of youngsters is apparent even to the hurried autoist of our times. A watchman with a first-aid kit is essential on a place like this. If the snow surface becomes worn, a light sprinkling of water can be given with a sprinkling wagon.

In hilly countries bob-sledding can be developed into a great sport. It requires considerable skill, but less than the professional tobogganning, and the amateur can get lots of fun and loads of good cheer and health out of it, by coasting down the country roads through the hills.

The lover of skiing will never think of any other sport. It is a great outdoor sport, in which our larger parks can give considerable service, especially those that have hilly grounds. As a rule, however, our city parks are a bit too tame for this sport. Ski jumping contests are valuable to attract people to it, but have the same objections mentioned before if they develop into a few men making high jumps and large crowds getting wet and cold feet watch-

ing the performances.

Studying the Footprints of Wild Animals in the Snow

This is hardly a winter sport, but I happen to belong to that great number of former kids who have never gotten over the admiration they once felt for the boy who could tell the difference between the jack-rabbit's trail in the fresh snow and the cottontail's. A wonderful article in the *National Geographic Magazine*, by Edward W. Nelson, in May, 1918, gave me the thought that it might not be impossible to have some one, interested both in the youngsters and in the wild animals, take out small groups of children and show them and explain to them the mysteries of these footprints, and get them acquainted with the habits of some of our winter animals. Is there any boy who has not inherited enough of the hunting instinct of our forefathers to want to know about these things? And is there any child whose love for animals and outdoor life would not be stimulated by studies like these? Maybe this should be left to the initiative of the schools; nevertheless, it is a service our parks can give.

The opportunities for winter sports are of very wide range. The park superintendent who tries to encourage all these sports may find the winter season equal to his famous busy spring season as far as the amount of work goes. But the valuable work he is giving his community will be appreciated by its citizens—he can rely on that; for the average citizen, ready as he is to criticize, will never fail to recognize the efforts made for his well-being and enjoyment, and he is a fair judge whether the park superintendent is giving the best there is in him, or is simply sleeping his winter sleep at the time that the snow cloak covers his lawns and the ice floor binds his lakes.

The American City Advocates City Motorization

TO THE EDITOR OF THE AMERICAN CITY:

We have been a subscriber to THE AMERICAN CITY for some time past and have been quite interested in several articles printed therein regarding the progress made by several cities in motorizing their departments, thereby enabling them to give more efficient service at a great saving to the taxpayers.

We wish to say that the articles and illustrations as published in THE AMERICAN CITY

have been an inspiration and a great service to this department in causing us to give our most minute attention to motorizing the entire department, and I want to assure you that THE AMERICAN CITY will help many municipalities by giving them such information as can be of great help to each city.

HENRY F. GOLDBACKER,
Deputy Commissioner of Public Works.
Syracuse, N. Y.,
September 22, 1920.

Street Cars Carry Publicity for City Ordinances

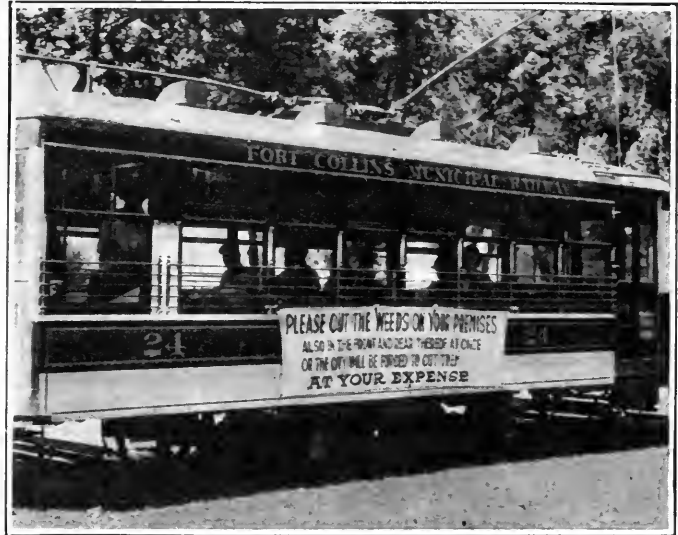
Fort Collins, Colo., Displays Snow and Weed Removal Notices on Municipal Electric Railway

THOUGH it is one of the minor functions of city government, keeping the sidewalks of small cities in northern latitudes free from snow in winter is perhaps one of the most vexing problems with which street department officials have to cope.

Fort Collins, a city of about 9,000 population, situated in northern Colorado, has since 1914 been operating under a commission form of government. This city has for many years owned and operated its own gravity water-works system and its own cemetery, and in January, 1919, it issued bonds and bought the local street car system, which had gone into the hands of a receiver under stress of war-time increase in operating cost. These street cars are often used as a means of informing citizens of municipal activities, as later described.

One of the city ordinances of long standing requires all property owners to remove snow and ice from their sidewalks within 24 hours after its fall, and in case the owner fails in this obligation, provides that the city remove such snow and ice at the owner's expense. The owner is then billed for the actual cost of such removal, and if the bill is not paid within 30 days, it becomes a lien upon the property and is certified to the County Treasurer for collection at the same time and along with the regular taxes.

There are in this city some 60 miles of sidewalks, so should the property owners fail to clean their walks it would be physically impossible for the city forces to clean all of them between storms; nor is it neces-



THE MUNICIPAL STREET CARS WARN OF WEEDS IN SUMMER AND SNOW REMOVAL IN WINTER

(See the front cover of this issue)

sary. By advertisement in the local papers and by banners 27 by 8-1/2 inches carried along the side of municipal street cars, the citizens are admonished to remove snow from their walks lest the city be forced to remove it at their expense. In addition, the coöperation of the reporters on local newspapers is sought, and often locals or editorials call upon the citizens to clear their walks; particular stress is laid upon the fact that owing to the supervision and overhead required for city forces, the cost will necessarily be greater than if they clean their own walks. The notices are continued in the paper and the banners still carried after the city forces start to work, and every possible means of giving publicity to the matter is made use of. Often the coöperation of the police is sought, and copies of the ordinances are left at the doors of householders whose walks are not clean.

The same general method is used in the summer for getting weeds cut on lots and the parking area in front.

Motorization Saves Thousands for Indianapolis

City Averts Enormous Increase in Cost of Hauling Its Ashes by Purchasing Tractors and Trailers

ON October 1, 1918, the contract for hauling ashes in Indianapolis expired. The contract had been held by the Indianapolis Hauling Company, which submitted a new bid. Beginning January 1, 1919, it would have cost \$84,000 a year, and \$54 an acre for annexed territory, to continue the ash-hauling work for a period of five years. The city immediately cast about for a new collection system. The result was the purchase of four 5-ton White trucks and twenty-five Lee trailers. This fleet started work in the winter of 1918-19. Since that time the motor equipment has gone faithfully along practically writing itself off the books. During 1919 a total of 115,286 cubic yards of material was collected and hauled to the dumps.

Figuring seven years as the life of the trucks and trailers, the item of depreciation for 1919 was approximately \$8,286. Operating costs, including oil, gasoline, tires, repair parts, labor on trucks and trailers, totaled \$12,305. An allowance of 6 per cent interest on the balance of the cost of the equipment adds \$2,784 to the year's total. Then throwing in a pay-roll of \$53,063, the total cost for 1919 amounts to \$76,439, which, on the basis of 115,286 cubic yards of ashes collected, gives approximately 66 $\frac{1}{3}$ cents as the haulage cost per cubic yard.

The real advantage of the motorized and city-controlled ash-hauling system is not at once apparent in these figures. The renewal terms proffered by the private contractors were not a flat figure of \$84,000, but rather that amount plus \$54 an acre for annexed territory. Since taking over its own ash-hauling job, the city of Indianapolis has extended its service facilities to a greatly enlarged territory, which, had it been annexed under the terms of the tentative new private contract, would have run the expense of that service very close to \$100,000.

The city now owns the equipment and controls its use. Formerly some sections of the city were neglected at times when the weather was inclement, and complaints were

accordingly vociferous and vexing. Calls and collections are now made regularly, in fair weather and foul, and complaints have consequently been reduced to a negligible number, according to Thomas A. Riley, supervisor of the Indianapolis Ash-Hauling Department.

Few Complaints Now

There used to be as many as 200 complaints a day, under the contract system, but now complaints average only 10 a day, a truly remarkable record when it is considered that 70,000 homes are served.

The best indication of the complete satisfaction which motor equipment has given is the authorization made recently by the Board of Public Works and City Purchasing Agent Dwight S. Ritter for the purchase of two additional White 5-ton trucks and a half-dozen more Lee trailers.

Lost Time Minimized

The Indianapolis method of ash collection is as follows: Horses, hauling trailers, cover given alley routes collecting ashes from house to house. The loaded trailers are then left at predetermined street locations, where empty trailers are waiting. The horses are hitched to the empties and start out for new loads. Meanwhile the tractors, on their way to the ash dumps, couple the loaded trailers, which have been abandoned at the street corners, to their trains and continue on their respective journeys to the dumps in various sections of the city.

A trailer will hold 4 cubic yards of ashes. Each tractor pulls a train of 3 trailers, making 6 round trips in a day. The entire fleet of four trucks and 24 trailers thus hauls 288 cubic yards of ashes daily. One cubic yard weighs between 1,100 and 1,200 pounds.

One of the outstanding features of the motor equipment is its flexibility. The equipment is frequently diverted from ash-hauling to snow-cleaning duties. During an intensive three-weeks springtime clean-up campaign 15,000 cubic yards of refuse were hauled. Every Saturday evening 35 trailer



WHITE TRACTOR TURNING A CORNER WITH TRAIN OF LEE TRAILERS LOADED WITH ASHES, INDIANAPOLIS, IND.

loads of refuse are hauled away from the city market-place.

Trucks Also Aid Garbage Collection

When a fire at the loading platform created an emergency in the garbage-hauling department, the trucks went to the rescue. Customarily garbage collections are made by 35 wagons, which haul their loads to the loading platform in the central part of the city. There cranes deposit the boxes on flat cars, 20 boxes to the car. Three cars are required to haul a day's collection of garbage to the city-owned reduction plant, located about four miles from the loading platform.

Wagon hauls range from a few blocks up to five miles. One wagon will average three loads a day. During the three weeks that

the trucks were used, they cut the hauling expense in the garbage department practically in half. One truck proved to be the equivalent of three wagons and it was found that a truck could be loaded in an hour and one-half. Thus a single truck accomplished in an hour and one-half the equivalent of a day's work for a horse. Moreover, the trucks travelled all the way to the reduction plant outside the city instead of only to the loading platform. Between 90 and 100 tons of garbage are collected daily in Indianapolis.

If the garbage collection department is ever completely motorized, the railroad spur from the loading platform to the reduction plant, and even the loading platform itself, can be eliminated, thus doing away with two items of expense.

Agreement Between City and Gas Company

An agreement between the city of Indianapolis and the Citizen's Gas Company, whereby the company will make extensions and improvements to its property by December 31, 1921, costing about one million dollars, has been signed by Charles W. Jewett, the Mayor, the Board of Public Works and the officers of the gas company.

The company's output is materially increased by the agreement, and the enlarging of its distributing capacity has established a priority order for the winter that gives local consumers for cooking, lighting and water-heating prefer-

ence over all other users, and makes it unlawful for other consumers to use gas in emergency periods.

The agreement was reached after several weeks of negotiation between the city officials and the gas company, and grew out of the great hardships which were endured by the people during the first cold snap of the season, when so many consumers used gas for heating purposes that the demand far exceeded the supply. At this time the company was forced to reduce pressure to the minimum to prevent an exhaustion of gas from all its mains.

Lighting Posts That Have Individuality

By Allen Henry Wright

WHEN municipalities undertake the installation of ornamental street lights, it might be well to follow the example of some of the cities on the Pacific coast where, in planning for ornamental lighting, designs of posts or fixtures appropriate to the individual towns have been selected.

Take, for instance, the city of Alhambra, near Los Angeles, Cal., a community which bears the name of the famous palace of the Moorish kings in Granada, Spain. Here will be found ornamental lighting posts bearing the star and crescent of the Mohammedans, used as an ornament at the base of the posts, while the lights themselves are suspended from the horns of crescents. A visitor can tell immediately when his car reaches the limits of Alhambra by the type of its lighting standards.

Again, in the adjoining small city of San Gabriel, whose reputation throughout the state is based upon the fact that within its confines are the remaining portions of one of the historic chain of missions established in the eighteenth century by the Franciscan padres, one finds ornamental light posts with globes shaped like the old mission bells, replicas of which mark the King's Highway, or El Camino Real, connecting the string of missions along the coast. By its lighting posts San Gabriel is known to travelers through that section of the state, and in a number of other California cities also are to



TYPE OF LIGHT POSTS USED IN SAN GABRIEL, CALIFORNIA

be found distinctive lights, suggestive of the history of the several communities.

Fire Prevention Is Everybody's Business

Fire prevention is a subject for community thought and community action because fire is in itself a community subject. This is due to the fact that fire is a restless force which ever seeks to break its bounds. The match in any man's pocket, the flame in any lamp, the spark from any motor, may be localized at a single point in one hour and in the next have become transformed into a spreading fire which threatens a number of buildings. When such a fire assumes large proportions we call it a conflagration, and then it is very much a community affair, since it may plunge hundreds or even thousands of people into a community of dire misfortune.

Everybody gets a thrill when the engines go clanging through the streets, but it is an expensive thrill compared with the feeling of satisfaction that comes from having a few extra firemen to do thorough fire prevention work. A loss from fire on buildings insured and uninsured, with the maintenance of the fire department and water-supply service, costs the United States more than \$2,000,000 a day. Last year 15,219 persons were burned to death and 17,641 were seriously injured. These figures can be greatly reduced through systematic, thorough fire prevention work on the part of municipal departments.

The Distinctive High School Building in Southampton, N. Y.

By Harold F. Sabine

Supervising Principal, The Public Schools of Southampton

THE Southampton High School building is one of the most beautiful school buildings in the state of New York. It is ideally located on a six-acre plot of land on the Montauk Highway, where it attracts the attention of all who enter the village. In the rear of the building is a fine athletic field with ample space for football, baseball, track and tennis.

The building is of modern fireproof construction in colonial design of soft-colored red brick with white marble and cement decorations, in keeping with the colonial aspect of the popular resort, which dates its founding from 1640. The central portion of the building is three stories high, crowned with a cupola from which a view is obtained far out over the Atlantic Ocean and Peconic Bay. On the third floor are well-adapted and equipped laboratories for physics and chemistry, as well as two commercial rooms. From the south windows of this floor one hears the breakers and sees a wide expanse of the ocean a few hundred yards distant. The second floor of the building is occupied by the High School proper—a school of about one hundred and fifty pupils and eight teachers. The central portion of the floor contains a well-lighted study hall and the balcony of the auditorium. On either side of the study hall are arranged seven classrooms, the library, the principal's office, and the boys' and girls' lavatories.

As one enters the front door of the building he catches a glimpse

of the beautiful auditorium, which is across the hall directly opposite the entrance. It has a seating capacity of about five hundred, and has stage facilities and exits to the gymnasium below, which makes it well adapted for amateur dramatics. There are ten grade rooms on this floor. In the basement are two large playrooms, the gymnasium, manual training rooms, a dressing-room, two lavatories, a cooking-room, the engine-room and a sewing-room.

The windows of the High School are very large but are given scale by the small lights and fine detail, a treatment rarely found in public schools, where unsightly large sheets of glass usually give a blankness and barrenness to the entire building. The architects of the building were Hewitt and Bottomley, of New York City.



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"Caterpillar" Tractors were selected for snow removal work by the New York City Engineers because of their endurance, power and traction. This winter, in the congested business districts of lower Manhattan, the *traffic will be kept open and fire danger prevented* from ice and snow covered streets.

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The Planning of Sebring, a Lake-Front Town in Florida

By A. D. Taylor

Landscape Architect and Town Planner, Cleveland, Ohio

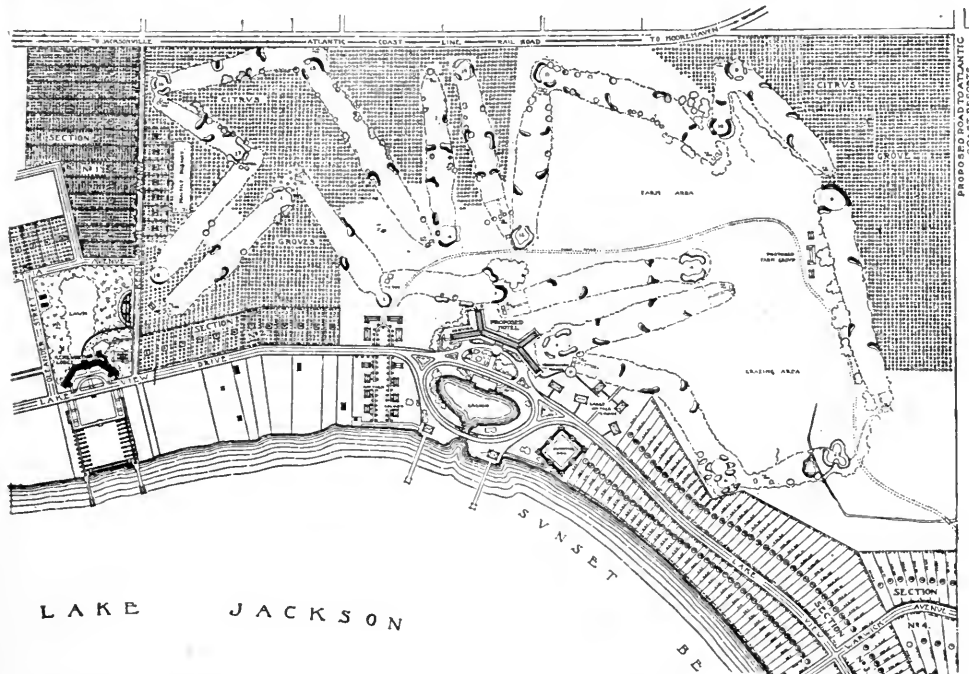
AMONG the interesting town developments which have been reported within the last few years is that of the town of Sebring, Fla. This town was started by George E. Sebring and his son approximately eight years ago. A site for its development was selected on the shores of Lake Jackson in southern central Florida. This lake covers an area of approximately fifteen square miles.

The success of most of the prosperous towns of the South depends upon two factors—one, the all-the-year-round population, and the other, the population of winter tourists. The central portion of Sebring has been carefully planned. The portion shown on the accompanying map, located within one-half mile of the center of the community, is the part which will in the future meet the requirements of the winter population. A comprehensive study has been developed whereby ideal surroundings

on the lake front can be provided for those who wish to enjoy a period of winter rest and recreation in the Florida climate. The problem has involved the location of two hotel sites, one of which has already been developed, and the second of which contemplates development in the near future.

For a distance of five miles on either side of the central portion of the town a macadam drive follows within thirty feet of the high-water mark of the lake. In designing communities of this kind, there are always possibilities of interesting drives which will make the scenery of distant sections easily accessible to those who wish to enjoy them.

The lake front lots have been designed in units approximating fifty feet in width, thus allowing the prospective purchaser to buy two or more units in order to acquire the desired area in his proposed home site.



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Dollars Speak in City and County Consolidation—Part II

By Leo H. Joachim

RECENT instances of city and county consolidation, notably those of Denver and Los Angeles, have confirmed belief in the efficacy of this reform in reducing materially the expenditures of municipal government.

The way to consolidation was a long and stormy one for Denver, lasting from 1904 to 1916, but in that year the city finally amended its charter under the authority granted to the people by Amendment XX to the state constitution. By this charter the modified mayor-and-council form of government was put into effect in the city and county of Denver, the mayor was made the residuary of executive power, and the entire system was made primarily an appointive one. The whole list of county officials hitherto elective has been abolished.

The mayor appoints four managers who have functions distributed as follows: manager of improvements and parks, with jurisdiction of city and mountain parks; city engineer, who has under him the control of highway paving, sprinkling, cleaning of streets, sewer, and street lighting departments; manager of revenue, who is city and county assessor and treasurer; manager of safety and excise, who directs police, fire and excise departments, is sheriff of the county and in control of city and county jails; manager of health and charity, who directs the health department, charity bureau, county hospital and county farm, and is coroner of the county. The managers have the appointive power for their respective departments.

The mayor appoints directly the city attorney and the water commission of five members. This body appoints a manager of the water plant. The mayor also appoints directly the following heads of de-

partments and public officials: industrial development bureau, building department, inspection department, commissioner of supplies, county superintendent of schools, city chaplain, two justices of the peace and two honorary boards, the art commission and the library board. The people elect the city council of nine members by districts, the city auditor, the election commission, district judges, district attorney, county judge and juvenile judge. All appointments by the mayor are made without confirmation by the council. Nothing could be more telling in a discussion on the economies effected in the Denver consolidation than the comparative chart of costs before consolidation, as read in a report before the National Municipal League at Detroit in November, 1917, by Professor William B. Guthrie of the College of the City of New York:

RELATIVE EXPENSES IN DENVER BEFORE AND AFTER CONSOLIDATION

	Expense, 1911	Appropriation, 1917
Assessor	\$85,000	\$54,000
Treasurer	64,300	61,500
Sheriff	28,500	20,500
Jail	84,000	34,100
County Clerk	37,400	28,000
Coroner	4,000	1,900
County Supt. of Schools	5,000	1,970
Justice of the Peace (3)	22,300	17,000
District Attorney	27,700	25,000
Court House	42,000	23,130
Hospital	150,000	127,000
County Farm	37,000	30,000
Support of Poor	58,000	47,500
Detention Home	6,000	3,800
Horticulture	1,700	1,200
Supplies	13,500	.....
General	33,000	.....
	\$699,400	\$476,800

These are the chief statistics available for the costs and must not be taken entirely at their face value, because of the changes that have occurred in the city government, and the lapse of time. Much of the economy is attributable to changes in the city

A Financial Service For the Municipality

We are prepared to inform municipal officials regarding

1. Present cost of raising money
2. The most desirable method of financing

Our municipal department handles state, county and municipal bonds representing over thirty states in the union. Our experience and facilities are at the disposal of any municipality.

Correspondence invited

A. B. Leach & Co., Inc.

Investment Securities

62 Cedar Street, New York

Chicago

Philadelphia

Boston

Buffalo

Minneapolis

Baltimore

Pittsburg

Cleveland



EUREKA SNOW PLOW

Horse Drawn Tractor Driven

Will mount curbs with ease and remove 24 inches of snow in one trip. The wings are adjustable to any width and either wing may be detached. One user writes regarding use with tractors, "The plow is so simple and the method of attaching so easy that these facts coupled with the reasonable price should make a strong appeal to all tractor owners interested in snow removal."

THE W. M. TOY COMPANY
Sidney Ohio

Snowless Sidewalks

made possible by

THE Martin
O.D. & CO. ESTABLISHED

All-Steel, Reversible, Adjustable, Practical
SNOW REMOVER

A heavy snow-fall blocks traffic, makes walking difficult and causes accidents.

Clean Sidewalks and Gutter

make for comfort and safety. The Martin is the ideal tool for this work. Catalogues and prices sent at once on request.



Two Men, a Team and A Martin can clean more miles of sidewalks or gutter in a day and at less expense than several old style outfits and do a better job.

**OWENSBORO DITCHER
AND GRADER CO., Inc.**
OWENSBORO Box 100 KY., U. S. A.

administration; much of it, however, must be attributed to consolidation, and this may be shown concretely.

Functions, for example, that were formerly divided between the county assessor and the county treasurer, both receiving a salary of \$4,600, and the city treasurer, at \$5,000, were merged into those of the office of manager of finance at a salary of \$4,000. Justice of the peace affairs which in 1911 cost \$22,300, to which was added a municipal court costing \$4,000, were covered after consolidation by city justices at a combined cost of \$17,000.

Two curtailments in expenditure that seem to be open to criticism are the cuts in the coroner's office and that of county superintendent of schools.

The Gains in Los Angeles County

Los Angeles has not gone as far as Denver, inasmuch as it has merely consolidated a number of offices and not entire units of government. It has been enabled to do this as a result of California legislation passed in 1895 (mentioned above) permitting counties to make their own charters. Four counties have availed themselves of the privilege, including, in addition to Los Angeles, Butte, Tehama and San Bernardino, but in none of these are governmental functions centralized. In each county two governments still function, although a large number of officials have been taken from the elective lists. In California the Legislature has this check on the exercise of home rule: the charter adopted by the county must be submitted to the Legislature for approval.

Los Angeles is perhaps the most notable example, as it has taken thirteen officials from the elective list. The consolidated offices are city and county assessor, city and county tax collectors, and city and county treasurers, the county officials acting *ex officio*.

The act of 1895, in brief, provides that any municipality except one of the first class shall have by ordinance the power to elect for the levying and collection of city taxes, the county auditor to render a statement to the city clerk of the assessed values of properties within the municipality, and the trustees of the city council to determine the rate of taxation and so to notify the county auditor. The county auditor then computes the city taxes in a special column of the tax roll.

The offices of city assessor and city tax collector, in the event of such consolidation, are abolished, and such duties as were performed by them other than those relative to assessments and collection of taxes are by ordinance transferred to other city departments. The act provides for an annual charge by the county of the actual cost for services, but not to exceed 1 per cent of the first \$25,000 so collected, and $\frac{1}{4}$ of 1 per cent for all sums over that amount. If the city elects to have the county treasurer act for it, an additional $\frac{1}{4}$ of 1 per cent is charged for that service. Of the forty municipalities included within Los Angeles County, twenty-three avail themselves of the act, very much to the taxpayer's advantage, according to W. O. Welch, County Tax Collector, both as to the convenience of being able to pay all the taxes on one bill, and in the matter of economy. A special act of 1917 extended the privileges to cities of the first class and chartered cities. Los Angeles at that time provided for such consolidation of the assessor's and tax collector's offices. Taking effect for the year 1917, the consolidation effected a saving to the city for that year of more than \$100,000 in salaries, which has increased correspondingly with the growth of the city for the successive years. Perhaps the greatest convenience of all is the fact that the taxpayer need pay only one bill. As to the cost to Los Angeles City, the act provided that it shall be actual cost, which sum is fixed for a number of years to be \$25,000 annually. This includes the service of assessing and collecting upon unsecured personal property taxes, assessing and collection of real estate and secured personal property taxes.

The Los Angeles experience is illustrative of the economies we may expect in consolidations. Surveying the diverse experiences of cities that have undergone such changes, we may safely say that important savings can be effected. How far the abolition of offices will be carried, how far the now elongated ballot must be truncated, must remain considerations for individual communities to solve according to their own needs, and will form problems for future students of government. The important consideration is that consolidation of city and county is being slowly accepted as one of the chief and most efficient means for the improvement of county government.

BAKER

AUTO TRUCK SNOW PLOWS

For Cities, Counties, Parks, Cemeteries, Universities, Hospitals and Large Industrial Plants

Right now is the time to arrange for your snow plows to assure good delivery. Baker Auto Truck Snow Plows are readily attached to practically any make motor truck. They are serviceable—sensible—safe.

They are equipped with our especially convenient lifting device. The blades are hinged and allow passage over obstructions without shock. Plows are made with 8 and 10 foot blades.

Hundreds of Baker Plows are in use in the Snow Belt and are giving real service.

We also make 20th Century Horse Drawn Snow Plows for sidewalk work

Write for for Descriptive Literature

The Baker Mfg. Company
503 Stanford Ave., Springfield, Ill.



Friedman "Snow-Loader" Revolutionizes Snow Fighting



This machine will positively handle your snow removal at a saving of 90 per cent over any other method now in use. The Friedman "Snow-Loader" has been used in New York City with unbounded success and satisfaction, loading trucks of 8 cubic yards capacity, at an average speed of 60 seconds. If these statements interest you, it will pay you to write for further information concerning the most efficient snow-fighting machine yet developed.

NATIONAL SNOW REMOVING CORPORATION

67 East 93rd St., New York City

The Smallest Ball Ground in the World

By Arthur Leland

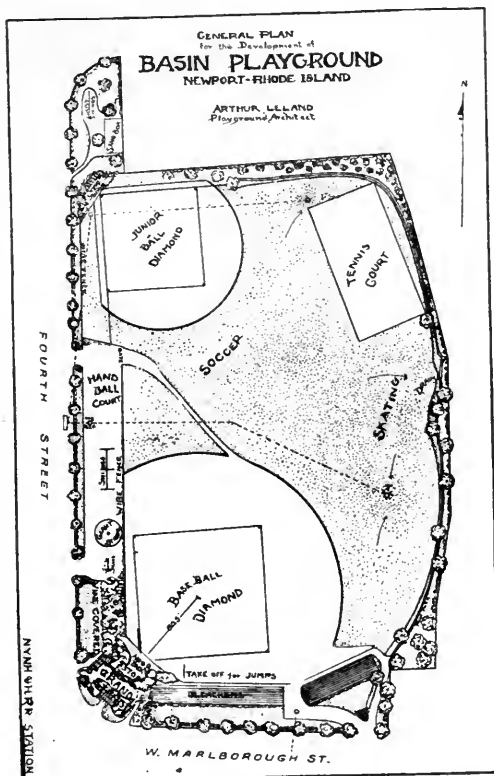
Playground Architect, Newport, R. I.

NEWPORT has one of the smallest baseball fields on which regular league games are played.

Baseball, as everyone knows, requires a considerable playing area, such as is usually found only on the outskirts of a city. The playground pictured on this page shows what can be done to limit the destructiveness of baseball and so civilize it as to bring it within the congested district of the city. The area required for playing the game itself is not large, but the problem of foul balls, broken windows, broken heads of passers-by and small children makes it necessary to play the game in an outlying section unless special precautions are taken.

The greatest width of the field shown is 250 feet. It is only 210 feet from the home plate to right field fence. If left field fence was as near, the playing area would be less than 1.2 acres. The extreme width of the field is 400 feet, and besides the regulation diamond, there is a small diamond where games are played simultaneously, the home plate of which is 350 feet away from the home plate of the main diamond. There are also swings, see-saws, a sand-box, baby swings for small children, a hand-ball court at the back of the back-stop, which is in constant use, take-off for jump, a football field and a tennis court. The entire area is so graded as to permit flooding in the winter for skating. All this on an area of 2.4 acres.

The average baseball bleachers and back-stop are numbered among the most hideous things man can make. Newport has improved upon these by means of a pergola effect covered with vines. In order to keep the baseball within bounds, a hood back-stop and screen fences are used. Home plate is under the hood. No batted ball can reach the street or the small children who play in other parts of the ground. Occasionally a high infield fly hits the net overhead. No foul ball can escape. This diamond has home plate within 40 feet of the street, where automobiles are parked and passenger trains are made up just the other side of the road, with a consequent congestion of travel. The most successful amateur

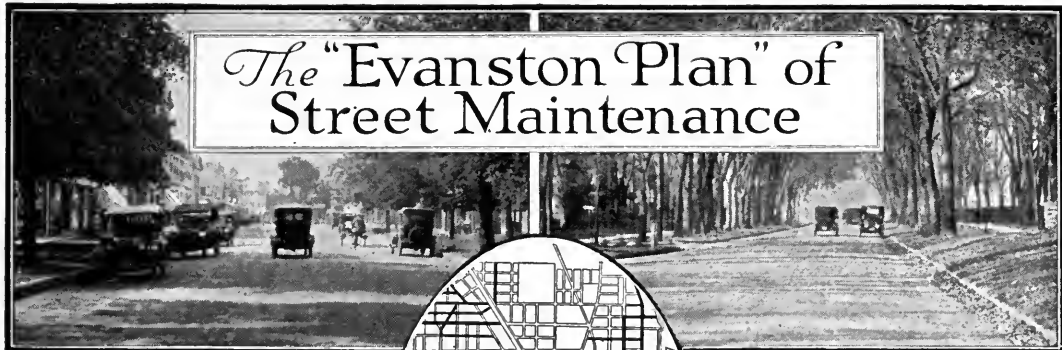


NOTHING OMITTED AND NO SPACE WASTED

baseball league ever operated in the city has played most of its games here. Last year interest in amateur baseball was kept up until the opening of the football season, for the first time in the history of the city. There have been no accidents, no broken windows, not a single lost ball—which in itself is quite an item with the present high cost of sporting goods.

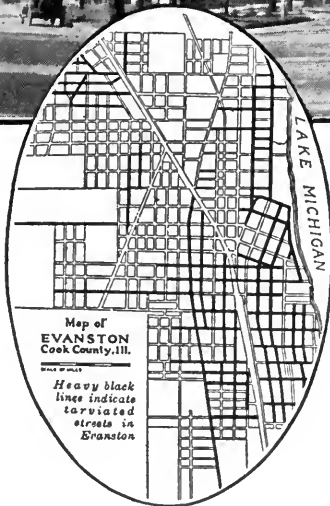
This ground is being saved for the location of a new passenger station and meanwhile is leased to the city by the New York, New Haven and Hartford Railroad Company on condition that the city assume responsibility and keep it in good condition. Every baseball team in the city wishes to play here in spite of the fact that there are full-sized diamonds on the outskirts of the city.

The "Evanston Plan" of Street Maintenance



Orrington Ave., Evanston, Ill., Old waterbound macadam surfaced with "Tarvia-A" June, 1915.

Sheridan Road, Evanston, Ill. One of the Improvement Association Streets, constructed with "Tarvia-A" in 1915-1916.



WITH natural pride in their beautiful city, which lies just north of Chicago, the property owners and city authorities of Evanston, Ill., have worked out what has come to be known as the "Evanston Plan" for keeping their macadam streets in first-class condition.

The property owners on many streets have local Improvement Associations, who voluntarily contribute to the cost of maintenance of their street. This fund was formerly used for street sprinkling, but is now being used in systematic Tarvia maintenance. The work is handled by the street department under the direction of the Commissioner of Streets. This has worked out so satisfactorily that some of the Associations have a surplus in their treasury, where formerly all the funds went into street sprinkling, and the streets are dustproof, waterproof and automobile proof.

Keeping Ahead of Old General Neglect

The policy of the City of Evanston is to repair and re-treat the streets *before it is absolutely necessary*. Three patrol gangs are kept on the streets all summer, immediately

patching any spot in the macadam that begins to show signs of wear. As a result, the entire system of more than a half million square yards of Tarvia-treated macadam pavement is kept in wonderful condition all the year round.

In fact, the streets of Evanston form a striking testimonial to the efficiency of systematic Tarvia treatment and low cost maintenance.

The Efficiency of Barrett Service

The present Commissioner of Streets, Mr. R. M. Brown, writes as follows:

"Efficiency of service by your company in the delivery and

application of Tarvia to the City of Evanston during the past season has been very satisfactory.

I assure you that your efforts in our behalf are appreciated, as we are able to keep our pavements in good serviceable condition despite the fact that they are subjected to unusually heavy traffic."

Property Owners Prefer Tarvia

Former Commissioner of Streets Mr. Walter W. Krafts, before leaving office, wrote as follows:

"The people of Evanston are satisfied in every respect, and in asking for work to be done on streets, are asking for Tarvia in preference to other binders."

The Evanston plan of street maintenance is attracting a great deal of attention in other municipalities.

We should be very glad to explain this plan in greater detail to any interested city official or property owner upon request. In writing, address the nearest Barrett Company office.

Tarvia

Preserves Roads-Prevents Dust

THE BARRETT COMPANY, Limited:

New York
Detroit
Salt Lake City
Johnstown
Elizabet

Chicago
New Orleans
Seattle
Lebanon
Buffalo
Montreal

Philadelphia
Birmingham
Peoria
Youngstown
Baltimore
Toronto

Boston
Kansas City
Atlanta
Toledo
Omaha

The Barrett Company
Winnipeg
Vancouver

St. Louis
Minneapolis
Duluth
Columbus
Jacksonville
St. John, N. B.

Cleveland
Dallas
Milwaukee
Richmond
Houston
Halifax, N. S.

Cincinnati
Nashville
Bengal
Lafayette
Denver

Pittsburgh
Syracuse
Washington
Bethlehem

Special Service Department

This company has a corps of trained engineers and chemists who have given years of study to modern road problems. The advice of these men may be had for the asking by any one interested. If you will write to the nearest office regarding road problems and conditions in your vicinity, the matter will be given prompt attention.

News and Ideas for Commercial and Civic Organizations

Chamber of Commerce Snow Fighters

ALBANY, N. Y.—It will be recalled that last winter, through the good work of its Snow Removal Committee, the Albany Chamber was able to open up the main highways between Albany and Schenectady, Albany and Troy, and Albany and Castleton, the three main arteries of travel in and out of Albany, during the height of the season's severe snow-storms. In this work the Albany Chamber had the hearty coöperation of the Chambers of Commerce of Troy and Schenectady, and of hundreds of citizens, including owners of motor trucks, who furnished trucks, road-scrapers and plows, or volunteered to shovel.

Especially helpful was the assistance given by the International Harvester Company, which generously donated the use of several tractors, plows and road-scrapers, as well as men to operate them. The Chamber of Commerce also independently hired a few tractors of the Cleveland Tractor Company for use in breaking the drifts on other roads. As a result of all this work, the roads were kept open. Many delivery trucks, containing food supplies, which had been stalled, were released, and at least five funerals which had been held up on the Albany-Troy Boulevard were pulled out of the snow.

This was, of course, all emergency work.

Almost immediately after it was completed, the chambers of commerce in this section got together and formulated a plan of legislation to provide for keeping the roads open to motor traffic all the year round, including a systematic method of snow removal. The committee had several bills in the last Legislature providing for a state-wide system of clearing the roads of snow under the direction of the State Highway Commissioner, who would have the work done in each locality by the county superintendent of highways. The idea was to standardize methods and equipment, and the bill provided for the securing by the county superintendents of the standardized equipment recommended by the State Highway Department, a procedure which should greatly reduce the cost.

This, and several similar bills, failed because of rural fear of expense, but the committees are at work upon another one which the Albany Chamber hopes will eventually become a law. The movement was unanimously endorsed at an important conference of presidents and secretaries of New York State organizations recently held in New York City at the offices of the Chamber of Commerce of the State of New York.

In the meantime, the emergency snow service has again been organized. Between 200 and 300 motor truck owners have offered the use of their vehicles, and the



OPENING UP THE ALBANY-CASTLETON ROAD LAST WINTER WITH TRACTORS, THE USE OF WHICH HAD BEEN DONATED TO THE ALBANY CHAMBER OF COMMERCE



“The Slide for Life”

Remember when you played Conquer Leader, the daring “Slide for Life”—down the side of a hay-stack, maybe? Remember the zest you developed for playing the game, the ambition to outstrip your playmates, the courage to see things through to a finish?

Perhaps the children in your city cannot have hay-stacks to slide down. But they can have playgrounds; playgrounds fitted with the most modern and scientific play tools yet produced, where they can make their “Slide for Life”—build courage, ambition, and the desire to win—just as you did years ago.

MEDART

PLAYGROUND EQUIPMENT

For fifty years the Medart Company has manufactured and perfected gymnasium apparatus for vigorous men—an experience that has particularly fitted it for the leadership it has always maintained in the playground movement and in the development of playground equipment best suited to withstand the severe use and abuse of the children.

Catalogue “L” fully describes Medart Playground, Swimming Pool, Gymnasium and Locker Room Equipment. Contains valuable suggestions for playground installations. It will be sent gladly to anyone requesting it on their letterhead.

Fred Medart Mfg. Co., Potomac & DeKalb, St. Louis, Mo.,

New York
52 Vanderbilt Ave.

San Francisco
Rialto Bldg.



A PEN-AND-BRUSH SKETCH OF THE HISTORICAL PAGEANT GIVEN IN RED WING, MINN., BY THE CHAMBER OF COMMERCE, PUBLISHED IN THE "RED WING DAILY REPUBLICAN"

Chamber's committee has taken steps to make available all the equipment that may be needed. An effort will be made to organize the volunteer workers into squads, each squad to report in rotation as soon as the snow begins to fly, and each to be kept at work clearing the roads until the storm ceases. It is hoped the work will ultimately be taken over by the state and county officials.

Several rousing meetings have been held, and 115 attended the last Snow Removal Committee meeting at which Colonel Frederick S. Greene, State Commissioner of Highways, was the principal speaker.

ROY S. SMITH,

Executive Manager, Albany Chamber of Commerce.

Fine Municipal Auditorium for Memphis

MEMPHIS, TENN.—This city is soon to have a combination auditorium and market-house, for the Supreme Court has upheld the validity of the act authorizing the issuance of bonds for such a purpose. Already \$750,000 worth of bonds have been sold, and more will be issued if necessary. The movement began in the Chamber of Commerce several years ago, and a committee which was appointed at that time is still serving.

Following the decision of the Court, a contract was let for clearing the site and salvaging the buildings now on the property. This work will require about three months, and actual construction will begin soon.

The new building will be modern in every respect and of handsome architectural design. It will have one large auditorium with a seating capacity of 12,500, which can be reduced for smaller meetings to 6,500 or 2,500. It will also have seven separate rooms, with a capacity each of about 300. The Commission expects to install a \$100,000 pipe organ.

JOHN A. OSOINACH,

Assistant Secretary, Memphis Chamber of Commerce.

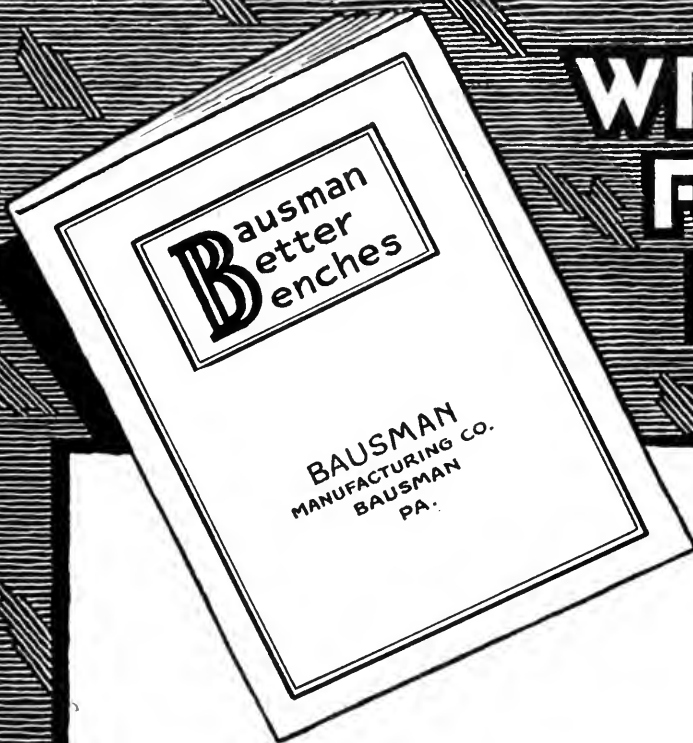
"Spirit of Red Wing" Portrayed in Historical Pageant

RED WING, MINN.—A beautiful historical, home-coming pageant was presented in Red Wing last August under the auspices of the local Chamber of Commerce, and proved to be an excellent medium of community publicity, applicable to other chambers of commerce which are considering out-of-door festivities of that character for next summer.

In this pageant the story of the community was dramatized by the people in the community, 700 of whom participated—men, women and children—all dressed in picturesque colored garments representative of the olden times. Among the throng of spectators were white-haired pioneers who fifty or more years ago had taken part in the very events enacted. They heard again the whoop of the redskin and the creaking of the ox-drawn cart, saw the first crops being planted as the wilderness was tamed, and again watched the "boys in blue" march away in 1861. The scenes were set forth in song and dance and a score of interesting tableaux in a great, rolling, grass-carpeted amphitheater on the grounds of the Red Wing Golf Club.

In the first episode, nestled among the hills was a reproduction of the Indian village in which Chief Red Wing, the sturdy Indian after whom the town was named, is supposed to have lived in the days before the white man invaded that beautiful wilderness. Full-blooded Indians were imported for the occasion. There were sixty Sioux from the Prairie Island reservation, a delegation of Chippewas from the wilds of northern Wisconsin, and six big chiefs from the Santé Indian reservation in Nebraska, now aged Indians, one of them 97 years old. The ancient warriors sat smoking their pipes while their squaws attended to the domestic affairs. In this

**WRITE
FOR
IT**



1921 CATALOGUE

Now Ready for Distribution

This new catalogue contains 16 illustrated pages showing by photographic reproduction all details of

Bausman Better Benches

The specifications, covering construction, size and finish, will be of interest to you. This catalogue will be a valuable addition to your file of park equipment.

Write for your copy today.

BAUSMAN MFG. CO.

BAUSMAN,

LANC. CO., PA.

scene a yelling party of braves comes running in bearing the scalps of their vanquished enemies.

So the story goes on, through the period when the red man was lord of the land in that part of the American continent, to the coming of the first group of white men and their thrilling experiences in attempting to establish a settlement there, the signing of a grant of their lands to the Government by the Indians over a pipe of peace, on through Lincoln's call to arms in 1861, to the days of 1914 when Europe called on America for help. The victorious return of the troops and the joyous celebration of the event by the home folks, in which all the participants in the pageant, led by the victory processional dancers, marched around the field and formed the final grand tableau with Columbia unfolding Old Glory to the strains of "The Star Spangled Banner," brought the pageant to a close.

"The Spirit of Red Wing," one of the most important characters, was impersonated by a young woman, who sang:

"I am the Spirit of the bold Red Wing;
I welcome you one and all;
As over the past our eyes we cast
And former days recall.
Gone is the sturdy Indian Chief;
Gone his tribe but not his will;
For the Spirit brave that the Red Man gave
Is the Red Wing Spirit still.
Gone the ox with his cart of wheat;
In the place are rail and mill;
But the winning way of the early day
Is the Red Wing Spirit still.
Gone are the men who built the town
At the foot of yonder hill;
But the plucky cheer of the Pioneer
Is the Red Wing Spirit still.
The Boys are back from the fields of France;
And tyrants cease to kill;
But the loyal, true Red, White and Blue
Is the Red Wing Spirit still.
Let us take up the busy task
With mind and heart and will;
And the dear old town shall have renown
For the Red Wing Spirit still."

A water carnival was held on the Mississippi River, on which Red Wing is located, in connection with the pageant, and was participated in by a fleet of 400 of Red Wing's motor-boats.

The idea of the pageant was conceived by the Red Wing Chamber of Commerce, which assumed full responsibility for it and handled all the committee activities. The Thurston Management, of Minneapolis, was secured to supervise the acting and stage the performance.

No stone was left unturned to make the event a home-coming occasion for the old residents. The Mayor sent out to all the early settlers whose addresses could be obtained, a circular letter containing an irresistible appeal to "Come Home." Across the top was a view of the Red Wing waterfront, and underneath, the words, "Come Home [picture of a single red wing] Red Wing, August 5th and 6th, 1920." Many of the early inhabitants voluntarily came to the pageant headquarters at the Chamber of Commerce and offered to cooperate in making the event a success. One of the episodes provided for the appearance on the stage of all the early settlers and their descendants at present living in Red Wing.

A souvenir of the pageant giving the scenario and program in full, and other literature used in working it up, may be obtained by addressing the Red Wing Chamber of Commerce.

CARYL SPILLER,
Formerly Manager, Red Wing Chamber of Commerce.

Dollar Days

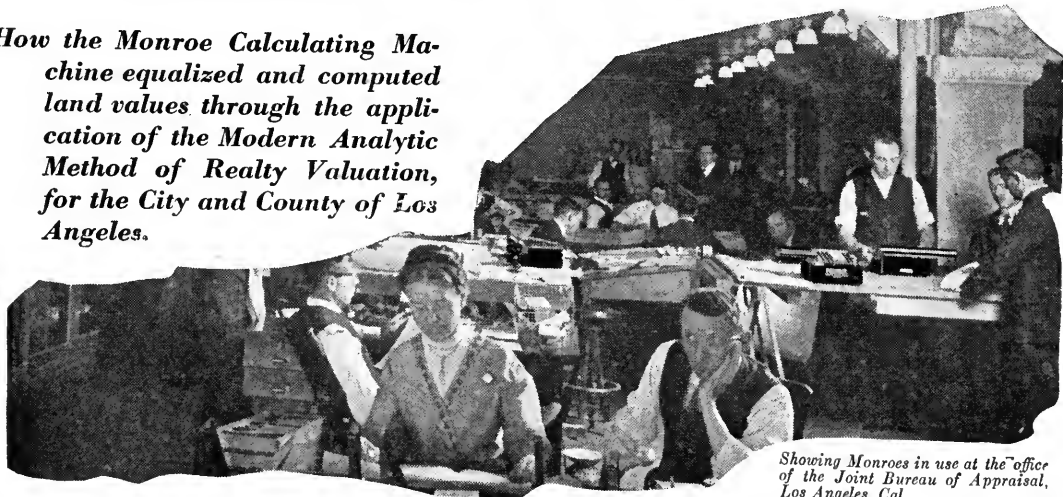
PORTSMOUTH, N. H.—Two eventful Dollar Days were held in Portsmouth on November 15 and 16. The "Dollar Day" idea is not new, but the interesting thing about these Portsmouth days was their tremendous success. Something like one hundred merchants entered into the plan. An advertising fund of \$1,000 was raised among them by the Retail Trade Division of the Chamber of Commerce, which had advertisements of the sale placed in every newspaper within a radius of twenty-five miles of Portsmouth. In the city papers several pages were used for the purpose by the Chamber of Commerce.

Three days before the opening of the sale, an 8-page supplement was run in one of the local papers, containing nothing but Dollar Day advertising. The Chamber had 6,000 extra copies of this supplement run off and distributed by automobile from house to house throughout a 20-mile area surrounding Portsmouth. The Dollar Day story was told in the street cars, on the moving picture screen, and by every other conceivable means. The store windows contained Dollar Day placards, and the displays in the windows were marked with hundreds of small Dollar Day signs.

The rush began the moment the stores were opened on the first day of the two-day sale. Many were obliged to close their doors four or five times during the day for

Computing Land Values on 400,000 Separate Parcels of Real Estate

How the Monroe Calculating Machine equalized and computed land values through the application of the Modern Analytic Method of Realty Valuation, for the City and County of Los Angeles.



Showing Monroes in use at the office of the Joint Bureau of Appraisal, Los Angeles, Cal.

THE Joint Bureau of Appraisal, Los Angeles, Cal., faced the tremendous task of computing land values on 400,000 separate parcels of real estate.

A mighty big job. But with the help of the Monroe Calculating Machine it was done so accurately, quickly and economically that the enthusiastic Superintendent wrote:

"The work of computing land values for the City and County Assessors marks an undoubted triumph in the application and use of the Monroe. In the hands of our 60 to 70 computers, it proved such a flexible instrument that without it we would never have made the record of handling such a mass of detail calculations. The most striking feature was the ease and facility with which men who have never used such machines before became quite proficient in a few days."

The Monroe's speed, accuracy and simplicity of operation (no trained operators required), adapt it for use on every kind of figure-work in every County, City and State office.

Figuring extensions on tax rolls, figuring balances, penalties and interest in the Treasurer's office—figuring water rates, cost of operation, etc., in the Water Department—figuring paving, bridge construction, curbs, sewers, etc., in the Engineer's office, the Monroe will readily assume the burden—in fact will make all your figure-work as easy as turning a crank.

Mail coupon for demonstration or more complete information contained in "How New York State saved \$85,000.00 and your request will be referred to the office nearest you of the 100 offices in United States and Canada rendering Monroe Service.

MONROE

REG U S PAT OFF

Calculating Machine

MAIL THIS COUPON NOW

Monroe Calculating Machine Co., Woolworth Building, New York.

Without obligation (check items desired)

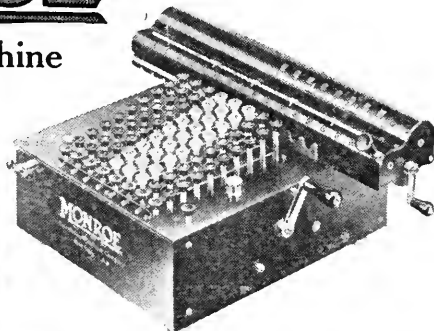
- ☐ Arrange for a demonstration in our office on our own work.
☐ Send us a copy of "Monroe Book of Facts".

Firm Name.....

My Name.....

Address.....

A.C. 1-21



fifteen minutes at a time in order to handle the crowds inside and prevent such congestion that selling would be impossible. Many merchants reported the result of the first day's sale as the largest in the history of their business, and in some instances the figures recorded a larger sale than in any two days' business theretofore experienced. The second day was a repetition of the first.

This was undoubtedly the most successful selling event ever held in this section. No prizes were offered, and there were no special features. The attraction lay entirely in the honest values given and in the earnest endeavor to satisfy the public. Large stocks of merchandise were moved, the spirit of coöperation among the merchants was strengthened, and scores of customers who had before been strangers to Portsmouth began to think of that city as their future trading center.

E. H. BAKER,
Secretary, Portsmouth Chamber of Commerce.

Okmulgee's New Hotel

OKMULGEE, OKLA.—A million-dollar hotel, planned and financed by the Chamber of Commerce, is under construction in Okmulgee and will be ready for occupancy early in 1921. This is said to be the first hostelry of its class to be built in the state. The Hotel Okmulgee, as it is called, is eight stories high, occupies one-half a city block, and is constructed of brick and terra cotta. There are 234 guest-rooms, a ballroom, three large dining-rooms, several private dining-rooms, and a large lobby. The hotel contains every modern convenience, including servidors in the kitchen.

The money with which to build the hotel was raised by the Chamber of Commerce in a two-day drive in which the business men, oil and coal producers, and manufacturers of the city subscribed to \$250,000 worth of the stock of the Creek Hotel Company organized to handle the project. The purchasers gave promissory notes payable in one year for the amounts of their sub-



THIS IS THE WAY OKMULGEE'S NEW HOTEL WILL LOOK WHEN COMPLETED

scriptions. These notes were deposited in the local banks, by which they are collected as they mature. The Creek Hotel Company has been able to borrow on them the balance required to complete the construction of the building, the entire cost of which, exclusive of the furnishings, is estimated to be about \$600,000.

When completed, the hotel will be leased to the Oklahoma Hotel Company, which will furnish, equip and operate it. A contract has been made with this company to furnish each guest-room at a cost of not less than \$1,200. The completed hotel will represent a total expenditure of about \$1,000,000.

A. R. HARRIS,
Assistant Secretary-Manager, Okmulgee Chamber of Commerce.

Chamber Wins Town's Coöperation

GREENFIELD, MASS.—The annual town meeting in New England is a sharp test of the educational force of the local chamber of commerce in building up public opinion. As every voter, rich or poor, blue-blooded or recently Americanized, has an equal vote and an equal opportunity to express his views on every article in the warrant presented at the yearly gathering of the voters, a far-sighted chamber of commerce will conduct a campaign of education throughout the preceding twelve months in order to gain the town's solid support of the projects it is advocating.

Greenfield passed a vote of confidence in its Chamber of Commerce this year, when

Cletrac
TANK-TYPE
TRACTOR

New York Buys 100 Cletracs

LAST February's terrific snow storm paralyzed surface traffic in New York for days. Only Cletracs and a small battery of whippet tanks just back from France were able to break through the drifts and clear the streets.

That one lesson was enough. City officials, after exhaustive tests, ordered 100 Cletracs which were delivered last December. That was the end of the winter traffic tie-ups in New York.

Every northern municipality, industrial corporation and railroad is face to face with the same problem. Let us help you solve it. Write for more detailed information.

THE CLEVELAND TRACTOR CO.

"Largest Producers of Tank-Type Tractors in the World"

19205 Euclid Ave.

Cleveland, Ohio



the following items, advocated by the Chamber, were put through: sewer extension, isolation hospital, increase in police force, and public comfort station.

At the next town meeting the Chamber will advocate the passage of a building ordinance, a town planning ordinance, a new high school, propositions with which it is already familiarizing the citizens who will pass judgment upon them in March.

This organization has had the wholehearted support of the town officials right from the beginning and, through the Board of Selectmen, has made grade-crossing improvements and put a stop to itinerant carnivals and loitering along the streets.

BENJAMIN H. BONNAR,
Manager, Greenfield Chamber of Commerce.

Sumter County's Road-Building Program

SUMTER, S. C.—Bonds for the construction of \$2,500,000 worth of hard-surface roads in Sumter County were recently voted after an intensive educational campaign conducted by the Sumter County Chamber of Commerce. Agitation of the subject was begun several years ago by the Chamber of Commerce, which finally succeeded in having an act passed by the Legislature authorizing the holding of a special election to settle the question.

The opening meeting of the campaign was held in the auditorium of the Girls' High School in Sumter, to which representative farmers and country merchants from each of ten townships were invited. A musical program and refreshments helped to make the evening a pleasant one. The company was addressed by L. H. Jennings, the chairman of the Hard Surface Highway Commission, of Sumter, who pointed out that the saving in gasoline, oil, and repairs to automobiles, as well as in time to the farmers, who would be able to haul two or three times as much material over the improved roads at less expense, would in the aggregate exceed the extra taxes the residents of the county would be asked to pay for the improvements, and that in ten years sufficient money would have been saved to more than pay back the entire bond issue to the taxpayers.

At this meeting a committee of nine members was appointed, with Mr. Jennings as chairman, to conduct the campaign of education. That committee subsequently called a conference of the officers and directors of

the Chamber of Commerce, the members of the Hard Surface Commission, and the Sumter County Board of Commissioners, at which the educational campaign was carefully planned. Speakers were elected for precinct meetings to be held on certain dates in fifteen different school districts. Each speaker was supplied with definite information beforehand. It was planned that three persons should present the subject at the meetings, each to handle it from a different angle. It was planned also to have certain well-known farmers and country merchants who were in favor of the bond issue speak a few words on the subject from the floor, if no more than to approve of the speakers' remarks and say they expected to vote for the bond issue.

The Managing Secretary of the Sumter County Chamber of Commerce was appointed campaign manager and publicity agent. The editor of *The Sumter Daily Item* was made associate publicity manager, his particular duty being to review the publicity material and make sure that nothing harmful to the cause was published.

Sixteen township meetings were held. Besides these, four-minute talks were given at the Chautauqua then in session in Sumter. The cause was also advertised at the motion picture theatres, both on the screen and from the platform. Thousands of invitations to the meetings were sent to the voters by the Chamber of Commerce. The members of the opposition forces were especially invited to be present and offer a better solution of the road problem, if they could, or to show cause in meeting assembled why the proposed plan was not the right way to secure permanent highways. In all the publicity material issued were statements to the effect that those underhandedly opposing the bond issue should be manly enough to face their fellow citizens and the speakers in open meeting, and that if they were unwilling to do this, their opinions were not worthy of attention by intelligent voters.

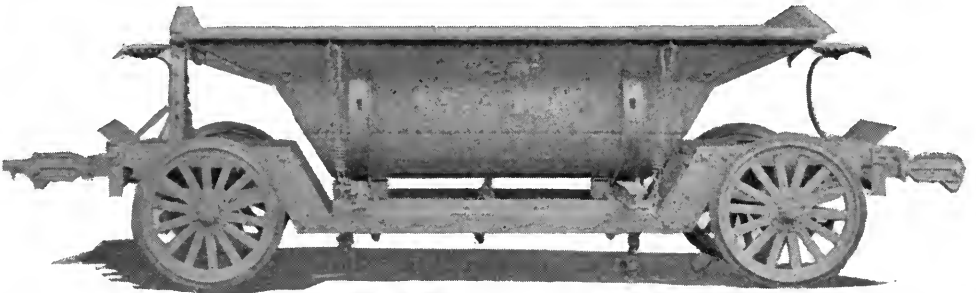
At only one meeting did any material opposition develop, and that was not in opposition to the bond issue, but to the particular highways which it was planned to improve. Differences of opinion on that subject were satisfactorily adjusted after the election, which resulted in a vote of nearly three and one-half to one in favor of the bond issue.

The act authorizing the bond issue stipu-

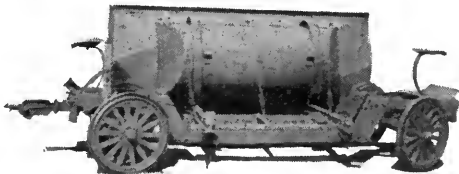
HIGHWAY TRAILER

EDGERTON
WISCONSIN

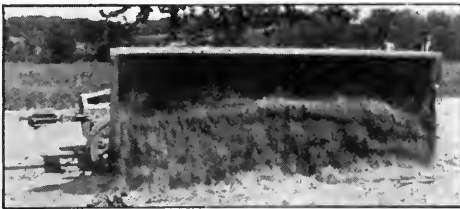
The Largest Trailer Plant in the World



Highway Trailers Solve Municipal Haulage Needs



The two-way side dump Highway Trailer with steel body, showing dumping action



Release of body lock automatically dumps load clear of wheels

**Cost \$200 to \$600 Less
Than Average Trailers**

The exclusive advantages which distinguish Highway trailers are a much greater factor in the wide preference they enjoy in all sorts of transportation than even the big price saving they effect.

The steel body, two-way side dump trailer, with drop frame was specially designed for garbage and ash disposal. The release of a lock automatically pitches the load clear of the wheels, in the desired direction. One man easily returns the body to upright position.

This type is easily adjusted for horse or motor traction. It has met with special favor in municipal hauling problems, because of its handling ease and the varied uses to which it is adapted.

Write for Literature or a Demonstration

One Man Loads, Unloads and Drives



One of the Highway Trailer types that has won a wide preference for municipal disposal needs

lates that nothing but permanent, hard-surface highways, built of concrete, bitulithic, asphalt, vitrified brick, or similar material, may be constructed. The program provides for putting a hard surface 16 feet wide on 120 miles of the county's main highway system, comprising ten roads radiating out from Sumter to the county line in ten different directions. The county will receive about \$1,000,000 additional from federal and state aid road building funds. If more money is needed to complete the program, the county authorities are assured that the necessary legislation can be obtained to make it possible to issue additional bonds.

It has been estimated that fully 75 per cent of the road revenues at present received by the county is expended for the up-keep of the 120 miles of highways which are to be hard-surfaced and which are traveled by at least 80 per cent of the county's inhabitants. When the improvements have been completed those revenues can be diverted to the construction of sand-clay lateral roads tributary to the main arteries of travel. The campaign has resulted in a demand all over the county for highway improvement, regardless of the cost. The public has at last come to realize that poor roads constitute a costly and burdensome liability.

E. I. REARDON,
Managing Secretary, Sumter County Chamber of Commerce.

Hagerstown's "Pep" Suppers

HAGERSTOWN, MD.—"Pep" suppers have been found by the Hagerstown Chamber of Commerce to be an effective means of working up interest in new activities upon which the organization desires to enter. At one such supper held early this fall the organization of the Retailers' Bureau was announced, and at another the organization of the Traffic Bureau. The Retailers' Bureau is now nicely started, with a man in charge to give out credit ratings, run a collection agency, eliminate the "fake" solicitor, and conduct trade extension movements. The Traf-

fic Bureau is made up of representatives of all the industries, manufacturers and traffic men of the community generally, and is at present working for an adjustment of the discriminatory freight rate on coal into Hagerstown.

Soon after the Retailers' Bureau had been organized, another supper was held in the interest of its work, at which J. Thomas Lyons, Service Manager of the *Baltimore Sun*, gave a humorous and much appreciated talk on "Buying at Home."

A supper was held one evening in November to stimulate the work of the Community Council, which was organized by the Chamber of Commerce in September for the purpose of carrying out the recommendations made in the community study conducted in Hagerstown under the direction of the American Red Cross. The subject under consideration was the federation of the charity and welfare agencies, and persons connected with the Federated Charities of Baltimore and the Baltimore Alliance were secured to address the guests.

An encouraging result of one of the "pep" suppers was the enrollment of fifty new members, which makes a total of eighty-four new members this year.

SIMMS JAMIESON
Manager, Hagerstown Chamber of Commerce.



THE ABOVE WINDOW DISPLAY WAS USED WITH GOOD EFFECT IN EUREKA, CALIF., IN THE REORGANIZATION CAMPAIGN THAT WAS RECENTLY CONDUCTED THERE FOR THE EUREKA CHAMBER OF COMMERCE BY THE AMERICAN CITY BUREAU

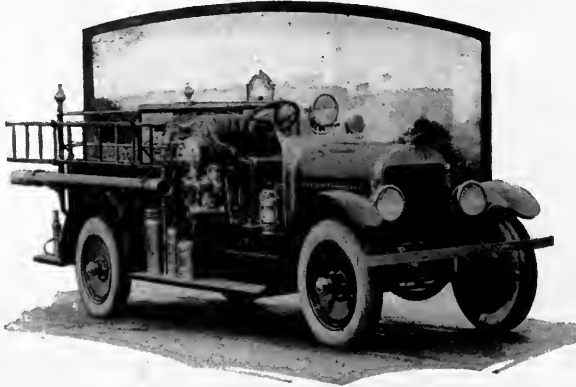
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Fire Service only*

STUTZ

Fire Apparatus

LEADS ALL OTHERS IN EFFICIENCY AND POWER

Built in all sizes and capacities



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WHAT WE PROMISE — WE FULFILL**

***STRENGTH and STRUCTURE
SERVICE and SATISFACTION***

**If contemplating purchase of Fire Apparatus
GET IN TOUCH with the STUTZ**

STUTZ FIRE ENGINE CO.

INDIANAPOLIS

INDIANA



The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing
Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

Property Owners in Territory Sought to Be Annexed to City Cannot Successfully Object on Sole Grounds of Becoming Liable to Municipal Taxation

In a proceeding by a city of the fourth class for the annexation of territory, wherein the property owners in the district sought to be annexed remonstrated that they would be subject to municipal taxation and liable for the cost of improving streets and building sidewalks, this did not constitute a "material injury" within the Kentucky statute, which provides that, if a majority of the resident voters or owners remonstrate "and" if the change will cause material injury, the annexation shall be denied. (Kentucky Court of Appeals, City of Georgetown vs. Pullen, 220 Southwestern Reporter, 733.)

City Not Liable for Negligence of Fireman

A municipality is not liable for a wrongful injury resulting from the acts of its servants or officers while engaged in the performance of their governmental duties. The maintenance and operation, by a municipality, of a fire department for the purpose of preventing and extinguishing fires, being a governmental duty, the municipality is not liable in damages to a bystander upon one of its sidewalks, who was knocked down and hurt by a hose reel which was being operated by firemen of the municipality while engaged in an attempt to extinguish a fire. (Georgia Court of Appeals, Hammond vs. City of Atlanta, 103 Southeastern Reporter, 39.)

Where, by Reason of Illegal Proceedings on Part of City, a Contract Is Not Entered into, the Bidder Is Entitled to Return of Check

Where one bids for a contract for a municipal improvement but afterwards ascer-

tains that the proceedings under which the improvements are being made are void, he is entitled to the return of a check deposited as security for entry into the contract on acceptance of his bid, holds the Kansas City Court of Appeals in the case of Koch vs. City of Weston, 220 Southwestern Reporter, 1007.

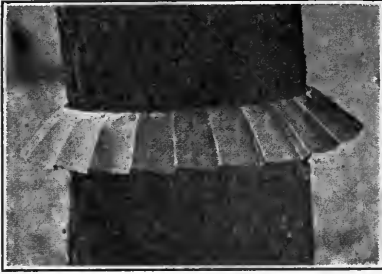
"When plaintiff deposited the certified check," says the Court, "he agreed that the same be forfeited as liquidated damages, if he should become the successful bidder and failed to enter into the contract; but this contemplated forfeiture was based upon legal proceedings by the city. In a failure to enter into a contract based upon illegal proceedings, which would result in the contractor receiving nothing for his work, the proceedings being void, the promise of the contractor, accompanied by the certified check, was a naked offer, supported by no consideration."

Substantial Compliance with Statute Directing Special Election to Determine Extension of Municipal Boundaries Is Sufficient

Where an act of the Legislature directs that a special election be held to determine the question of the extension of municipal boundaries, and provides the general form of the resolution and notice to be given, a substantial compliance therewith is sufficient if it gives adequate notice of the time and places of voting and sufficiently designates the voters authorized to participate. (West Virginia Supreme Court of Appeals, Hood vs. City of Wheeling, 102 Southeastern Reporter, 259.)

Blanket Street Improvement Contracts

A municipality may improve several streets under a single contract. (California District Court of Appeal, Blake & Bilger Company vs. Chappell, 186 Pacific Reporter, 823.)



STANDARD TREE BANDS

PROTECTS TREES AND LARGE SHRUBBERY AGAINST ALL CLIMBING WORMS, CATERPILLARS, MOTHS AND INSECTS.

LASTS A SEASON—FULLY GUARANTEED.

Made of heavy waterproof paper, with a sticky material under the umbrella-like canopy. This canopy protects the "gum stickum" from the weather, as well as from dirt, dust and falling leaves.

No climbing caterpillar or insect can pass this sticky material. It catches them and holds them if they set foot upon it.

Attached to the band, on the inside, is a strip of fluffy felt. This felt fills up the depressions in the bark and prevents passage under the band. No cutting away of bark is necessary. The felt fills it up.

Guaranteed to be effective for the season, in all weathers and all temperatures in which worms or insects are active (about 40° Fahr. to highest summer heat).

Put up in rolls, 25 and 100 foot lengths, flat when boxed, mushrooms when tacked on tree.

Easily applied. Simply cut length to encircle tree. Tack, then raise the outer band until it stands out like an umbrella. It will mushroom as shown in cut and so remain. It only takes a moment.

Cheaper and better than the usual sticky materials applied direct to bark. Positively cannot injure tree. Bark colored and not unsightly. Can be taken down and discarded at end of season.

The most effective and practical method of banding trees yet devised—also the cheapest. Has the endorsement of foresters and fruit growers everywhere.



A powerful, highly concentrated and soluble plant food for flowers, house plants, shrubbery, trees, gardens, truck lands and lawns.

Promotes luxurious growth; increases the yield; imparts a deep green color to foliage and brilliancy to flowers.

The most highly concentrated and properly balanced fertilizer ever compounded.

Many times the strength of ordinary fertilizers. Never before has such a high analysis been attained.

A pinch will intensely fertilize a house plant, a one-pound package 200 square feet.

Standard Flower and Garden Fertilizer will revive those puny, pale, sickly plants, flowers, trees, shrubs, etc. A trial will convince.

ANALYSIS

Nitrogen	15 to 17 per cent
Equiv. Ammonia . . .	18 to 20 per cent
Avail. Phos. Acid . . .	10 to 12 per cent
Potash (K2O)	8 to 10 per cent

Odorless

Put up in 1 and 5 lb. Boxes and 25 lb. Bags.

Extensively used in parks, cemeteries and public grounds.

Write for samples and prices.

THE EGGERT CHEMICAL CO.,

AGENTS WANTED EVERYWHERE

Canton, Ohio

WRITE FOR PROPOSITION

Actual Notice, or Lapse of Sufficient Time so That Defect Should Have Been Discovered, Necessary in Order to Hold City Liable for Injury Caused by Broken Flagstone

A city which maintained a flagstone as covering for a gutter basin in a street or way, was bound to exercise a reasonable degree of watchfulness to detect any instability in the stone; actual notice was not essential to charge it with liability to an injured pedestrian. If the flagstone which broke under a pedestrian's weight, to his injury, was broken, cracked or impaired between 5:35 P. M. of one day and 8 A. M. of the next day, when the accident occurred, the city could not, in the absence of actual notice of the defect, be liable as for negligence. (New York Supreme Court, Appellate Division; *Treadwell vs. City of Yonkers*, 182 New York Supplement, 675.)

In Absence of Clear Abuse of Discretion, the Finding of Mayor and Council of Necessity for Sewer Improvement Will Not Be Disturbed

The Oklahoma statutes grant to a mayor and council the power to determine the necessity of establishing certain sewer districts within the town or city, and the general rule is that the finding by a city council that such improvement is necessary is final and cannot be reviewed by the courts in the absence of fraud and oppression. The general rule is, where the mayor and city council have determined a certain sewer improvement necessary, the courts cannot interfere to prevent said improvement, except in cases where it clearly appears that the discretion of the local legislative branch of the government has been abused and the ordinance is so unreasonable and oppressive as to render it void. (Oklahoma Supreme Court, *Crawford vs. Cassity*, 190 Pacific Reporter, 412.)

Dedication of Streets, Parks, etc.

The platting of land and the sale of lots pursuant thereto creates as between the grantor and the purchasers of the lots a private right to have the space marked upon the plat as alleys, parks, etc., remain open for ingress and egress and the uses indicated by the designation; but, so far as the public is concerned, such acts amount to a mere offer of dedication which, to complete

the dedication, must be accepted before there is a revocation. (Florida Supreme Court, *City of Miami vs. Florida East Coast Railway Company*, 84 Southern Reporter, 726.)

Notice to City of Claim for Damages Must Be Accurate as to Time and Place

A claimant who notifies a city that his injuries were received on a day other than the true date does not comply with the Montana statute providing that a city shall not be liable in damages for injuries unless notice thereof, stating time and place, be given within 60 days.

In deciding the above-stated proposition in the case of *Berry vs. City of Helena*, 182 Pacific Reporter, 117, the Montana Supreme Court said:

"A like provision is found in the statutes of nearly every state, and it is held quite uniformly that the notice must state accurately the time when the injuries were received. And this construction is not unreasonable. The claimant is in a better position than the city to know when his injuries were received, and the obvious purpose of the statute is to require him to give the city correct information to the end that an investigation to some purpose may be made. If the claimant is not required to give the true date, where shall the line be drawn? If he may vary two days, why not two weeks or a month? Who shall say what is and what is not a reasonable variation from the truth?"

"The statute means just what it says. The notice must state the time when the injuries were received, and since our Code takes no account of the fractional parts of a day in a case of this character, the notice must state the day upon which it is claimed that the accident occurred. The statute prescribes no particular form of notice, and mere informalities would not vitiate a notice, but the statement of the time and place of the accident is made a matter of substance, not merely a matter of form, and the courts are not authorized to change the statute."

Hack-Stand Permit Ordinance Based on Securing Consent of Abutting Owners Upheld

A city ordinance which in effect grants special permits to licensed hack drivers who can procure the consent of the abutting property owners to stand their vehicles in the street in front of such property, is not unconstitutional on the ground that it grants special privileges, although the same privilege is not granted to those who do not obtain such consent. (Kansas Supreme Court, *Mader vs. City of Topeka*, 189 Pacific Reporter, 969.)

DOW Calcium Chloride Flake Preserves Gravel and Macadam Roads

What wears out macadam or gravel roads?

Small *loose* particles are blown away as dust—they are pulled away by the vacuum created by rapidly moving wheels.

Every time a layer of dust raises, every time tiny particles are thrown or washed away, still another layer is exposed to the disintegrating action of traffic and the elements until the road surface is broken down.

Dow Calcium Chloride Flake binds the small particles together so that each is held by its neighbor in a vise like grip. The Calcium Chloride takes sufficient moisture from the air to retard the dusting away.

Dow Calcium Chloride Flake provides the binding properties lacking in dry gravel, aids packing, retains moisture, provides adhesion of one particle to the other. It makes a dense, hard, long wearing surface.

The Michigan State Highway Department, after thorough research on binders and dust preventives for gravel and macadam, have used and are using thousands of tons of Calcium Chloride on graveled trunk roads.

Dow Calcium Chloride Flake is made on the same precise accurate basis as are the vast quantities of other chemicals produced in the Dow plant which covers more than one hundred thirty-five acres of ground and employs more than one hundred graduate chemists and internationally famous research men.

If you would make a reputation for low cost road maintenance and longer lasting roads, let us discuss with you by letter at once, the value of Dow Calcium Chloride Flake for your particular road problems, whether on trunk roads or in parks, cemeteries and private estates where dust prevention is a problem.

The Dow Chemical Company

Midland, Mich.

U. S. A.

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The word "DOW" is written in a large, bold, serif font, centered within a large diamond shape formed by a thick black border. The diamond is oriented with its points up and down.

DOW

MARK

Municipal and Civic Publications

AMERICAN POLICE PROBLEMS.

Raymond B. Fosdick, Former Chairman of Commission on Training Camp Activities. The Century Company, New York. 1920. 408 pp.

This book is intended as a companion to "European Police Systems," by the same author. The book is based upon personal study of the police in practically every city in the United States with a population exceeding 100,000, and in many smaller communities. In all, seventy-two cities were visited, and just before publication data were checked over and brought down to date. The book is a thorough survey of such questions as the overwhelming prevalence of crime in the United States as compared with the countries of Europe, and discusses the various complicated problems which American police bodies are called upon to meet.

MUNICIPAL LANDING FIELDS AND AIRPORTS.

Edited and compiled by George Seay Wheat. G. P. Putnam's Sons, New York. 1920. 96 pp. Map and illustrations.

This volume was written to present to the public the entire problem involved in the creation and administration of flying routes, landing fields, and airports. The chapters discussing the various problems are written by distinguished authorities, including Gen. Menoher, Chief of the Army Air Service, and Captain Craven, Director of Naval Aviation.

THE AMERICAN DEMOCRACY.

A text in Government for use in High Schools, Academies, and Normal Schools. S. E. Forman. The Century Company, New York. 1920. 474 pp. Illustrated.

A study of American political and civic conditions, including chapters upon the County, the Town, the Township, and the Municipality.

HANDBOOK OF BUILDING CONSTRUCTION.

George A. Hool, Consulting Engineer, Madison, Wis., and Nathan C. Johnson, Consulting Engineer, New York City. McGraw-Hill Book Company, Inc., New York City. 1920. Volume I, XLIV + 802 pages; Volume II, 672 pages. Tables, diagrams and illustrations.

A most complete treatise of the subject of building construction, in two volumes, compiled by a staff of 46 specialists and edited by Hool and Johnson. The books are specially prepared for architects, designing and constructing engineers, and contractors, and contain complete statements of theory and practice in design and construction, estimating and contracting, and mechanical and electrical equipment.

BROKE.

Edwin Brown. The Four Seas Company, Boston. 1920. 370 pp. Illustrated.

This book narrates the personal experiences of a man who, in order to satisfy himself as to what the different cities were doing for men out of work, voluntarily lived and suffered with the homeless and penniless. The book is a strong plea for the establishment of municipal lodging-houses, where men may obtain free shelter for the night.

COMMUNITY ORGANIZATION.

Joseph K. Hart, Professor of Education in Reed College. The Macmillan Company, New York. 1920. 230 pp.

One of the series of the Social Welfare Library, edited by Edward T. Devine. It is the outgrowth of ten years of work in social and educational lines in the Western States. It approaches social problems from the standpoint of the community as a whole.

TAXATION IN KENTUCKY.

Simeon E. Leland, A.M., Assistant Professor of Economics, University of Kentucky. Published as Number 1, Volume 1, Publication of the University of Kentucky. 1920. 170 pp. and index. Charts and diagrams.

An exhaustive study of the existing systems of taxation in Kentucky, with proposals for changes which would bring about greater and more efficient centraliza-

tion of taxation administration. The plan contains the best features of the laws of many states, and resemblances can be traced to the organization of the Wisconsin and New York taxation organizations.

THE HOUSING FAMINE.

How to End It. A Triangular Debate Between John J. Murphy, Edith E. Wood, and Frederick L. Ackerman. E. P. Dutton and Company, New York. 246 pp.

A discussion of one of the most urgent of problems, presenting three theoretical methods of meeting it. Mr. Murphy speaks for the free functioning of private enterprise, Mrs. Wood for state and municipal aid for housing projects, and Mr. Ackerman for a complete change in our industrial life which will eliminate profits and price competition and incidentally settle the housing difficulty.

CONFERENCE OF SOCIAL WORK.

Proceedings of the National Conference of Social Work, at the Forty-Seventh Annual Session in New Orleans, La., April 14-21, 1920. The University of Chicago Press, Chicago. 1920. 524 pp. Illustrated.

This volume contains the complete proceedings of the conference, and complete reports of all papers delivered.

HOUSING BETTERMENT.

How England is Meeting the Housing Shortage. By Lawrence Veiller. Published as the September, 1920, number of "Housing Betterment." The National Housing Association, 105 East 22nd Street, New York. 106 pp. 1920.

This is a thoroughgoing discussion of housing in England, including consideration of the needs, the means adopted to meet them, the difficulties of the task, and the results obtained from the effort. It affords accurate and detailed information on a subject of very great importance at this time.

SOCIAL AGENCIES.

"The Story of a Year's Work." The Annual Report of the Central Council of Social Agencies for the year 1919-1920. Bulletin of the Central Council of Social Agencies, of St. Louis, Vol. I, No. 4, Oct., 1920. (Apply to the Secretary, Scott R. DeKins, 511 Locust St., St. Louis, Mo.)

CIVIL SERVICE.

"The Philadelphia Classification," a Statement Prepared for the Mayor and City Council by the Pennsylvania Civil Service Reform Association. Recommendations as to accurate titles and standard salaries, with conclusions. Nov., 1920. 11 pp. (Apply to office of the Pennsylvania Civil Service Reform Association, 810 Otis Building, Philadelphia, Pa.)

TREE SURGERY.

"Tree Surgery," by J. Franklin Collins, Forest Pathologist. Published as Farmers' Bulletin 1178, U. S. Department of Agriculture. Contribution from the Bureau of Plant Industry. 32 pp. Illustrated. 1920. (Apply to Division of Publications, United States Department of Agriculture, Washington, D. C.)

SCHOOL BUILDINGS.

"Determining the Number of Rooms For a Departmental School Building," by Frank Irving Cooper, Architect, Chairman N. E. A. Committee on the Standardization of Schoolhouse Planning and Construction. A paper read before the Department of Administration, N. E. A., July 7, 1920. 16 pp. Illustrated. (Apply to Frank Irving Cooper, Architect, Boston, Mass.)

CITY PLANNING.

The City Plan of Flint, Mich., including the report of Dr. John Nolen, City Planner, and Bion Arnold, Transportation Engineer. 95 pp. Maps and illustrations. An attractive work, giving in great detail a civic survey, planning studies, a discussion of housing needs, and of transportation problems and their solution. (Apply to Irving C. Root, Secretary, Planning Board, Flint, Mich.)

THE AMERICAN CITY

DISTANT CONTROL OF GATE VALVES

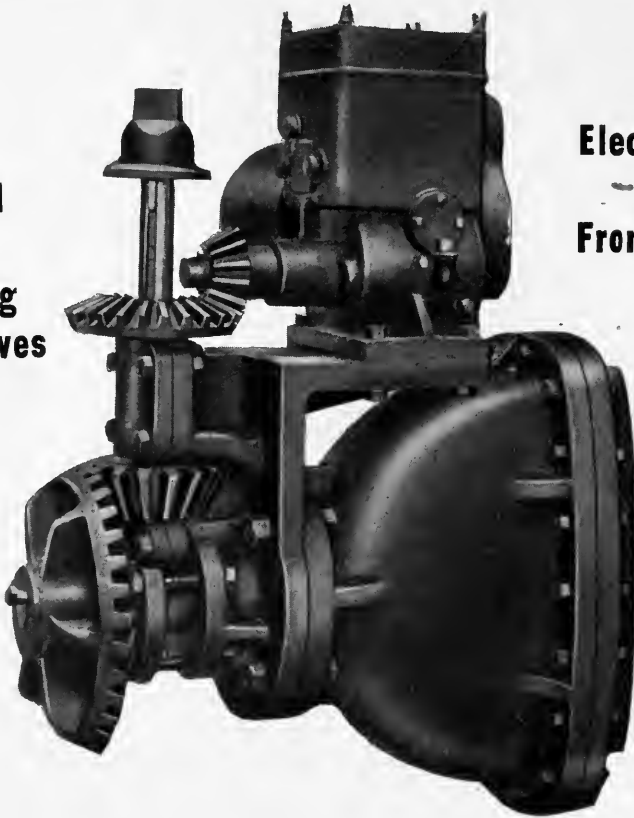
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WATERPROOF—For Vault Installation.

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tant or Local Points.

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LABOR LEGISLATION.

"Review of Labor Legislation for 1920." Published by the American Association for Labor Legislation, 131 East 23rd St., New York. 49 pp. 1920. This is the Sept., 1920, issue of "The American Labor Legislation Review," and contains the Draft Conventions and recommendations adopted by the International Labor Conference of the League of Nations, Genoa, June 15-July 10, 1920. (Apply to the publishers, address given above.)

STREET RAILWAYS.

"Working Capital in Street Railway Valuation," by Delos F. Wilcox, Ph.D., Public Utility Expert. Published as supplement to "The Annals of the American Academy of Political and Social Science, Nov., 1920. 24 pp. (Apply to The American Academy of Political

and Social Science, 39th St. and Woodlawn Ave., Philadelphia, Pa.)

JUVENILE-COURT LEGISLATION.

"A Summary of Juvenile-Court Legislation in the United States," by Sophonisba P. Breckenridge and Helen R. Jeter. Published as Legal Series No. 3, Bureau Publication No. 70 of the Children's Bureau, U. S. Department of Labor. (Apply to Julia C. Lathrop, Chief of Children's Bureau, Washington, D. C.)

WORKMEN'S COMPENSATION.

"Standards of Workmen's Compensation Laws." Published by The American Association for Labor Legislation. Revised to Nov. 12, 1920. 12 pp. (Apply to the Association, 131 East 23rd St., New York City, N. Y.)

The publications listed above are for sale by their publishers. Those listed below are understood to be free upon application.

BIBLIOGRAPHY ON INFANT CARE.

"A Bibliography of the Care and Feeding of Infants and Children." A list of books, magazines and pamphlets for mothers, fathers, boys and girls, schools, libraries, health officers and nurses. 15 pp. (Apply to the Bureau of Child Hygiene, New Jersey State Department of Health, Trenton, N. J.)

FIRE ALARMS.

"The Adequacy and Relative Economic Position of Municipal Fire Alarm Systems." An address by J. T. Greene, Superintendent, Fire and Police Telegraph, Toledo, O., at the convention of the International Association of Municipal Electricians, at New Orleans, La. 8 pp. and map. (Apply to the Gamewell Fire Alarm Telegraph Co., Newton Upper Falls, Mass.)

FIRE AND ACCIDENT PROTECTION.

A series of six pamphlets issued by the National Board of Fire Underwriters. They include the following titles: Regulations of the National Board of Fire Underwriters for the Storage and Use of Fuel Oil; List of Inspected Automotive Appliances; Regulations of the National Board of Fire Underwriters Governing the Installation of Automatic and Open Sprinkler Equipments Recommended by the National Fire Protection Association; Regulations of the National Board of Fire Underwriters for the Installation, Maintenance and Use of Piping and Fittings for City Gas as Recommended by the National Fire Protection Association; List of Appliances Inspected for Accident Hazard*; List of Inspected Electrical Appliances.* All dated 1920; those marked (*) revised to October, 1920. (Apply to Underwriters' Laboratories, 207 East Ohio St., Chicago, Ill.)

CITY-MANAGER PLAN.

"The Story of the City-Manager Plan." A symposium of the experiences of cities under the plan, a general discussion of its theory and workings, and the principles of a standard charter. Includes list of all cities in the United States employing the plan in 1920. 32 pp. (Apply to the National Municipal

League, Harold W. Dodds, Secretary, 261 Broadway, New York City.)

PUBLIC HEALTH.

A series of three pamphlets by Ruth A. Dodd, Supervisor of the Bureau of Child Hygiene and Public Health Nursing of South Carolina, on the subjects of Rural Child Welfare, Midwifery, and Public Health Nursing. (Apply to James A. Hayne, M.D., Secretary, State Board of Health, Columbia, S. C.)

CONCRETE CONSTRUCTION.

"Shearing Stresses in Reinforced Concrete Beams," showing the advantages of rigid connection of web reinforcement. By H. S. Rogers, B.Sc., C. E. 12 pp. 1920. (Apply to Engineering Department, Truscon Steel Company, Youngstown, Ohio.)

MALARIAL MOSQUITOES.

"A Study of the Malarial Mosquitoes of Southern Illinois. Operations of 1918 and 1919. By Stewart C. Chandler. Published by the Department of Registration and Education of the State of Illinois, Division of the Natural History Survey. 15 pp. and illustrations. (Apply to Stephen A. Forbes, Chief, Division of the Natural History Survey, Urbana, Ill.)

AMERICANIZATION.

"Problems in American Democracy." A manual for use in the public schools of New Jersey, prepared by Dr. Albert B. Meredith, formerly Assistant Commissioner in Charge of Secondary Education. 52 pp. 1920. (Apply to C. N. Kendall, Commissioner of Education, Trenton, N. J.)

THRIFT.

"Teaching Children How to Save." An outline of material prepared as a guide for superintendents, principals, and teachers in making the teaching and application of the principles of saving and investing of money, and the wise use of material and time, a part of their regular school program. 21 pp. 1920. (Apply to Savings Division, War Loan Organization, Treasury Department, Washington, D. C.)

Municipal Reports

Cambridge, Mass.—Annual Report of the Water Department for the year ending March 31, 1919. 51 pp. (Apply to Walter H. Harding, Clerk of the Cambridge Water Board, Cambridge, Mass.)

Chicago, Ill.—Quadrennial Report of the Board of Local Improvements of the City of Chicago. An account of the activities of the department for the period 1915 to 1918. 100 pp. Illustrated. (Apply to Edward J. Glackin, Secretary, Board of Local Improvements, Chicago, Ill.)

Wilmington, Del.—Forty-ninth and Fiftieth Reports of the Board of Water Commissioners for the years, respectively, of 1917-18 and 1918-19. (Apply to William G. Coxe, Board of Water Commissioners, Wilmington, Del.)

New Orleans, La.—Fortieth Semi-Annual Report of the Sewerage and Water Board. Dec. 31, 1919. (Apply to F. S. Shields, Secretary, Sewerage and Water Board, S. & W. Board Building, New Orleans, La.)

Newport, R. I.—Annual Report of the Street and Highway Department for the Municipal Year of 1919. (Apply to John F. Sullivan, Street Commissioner, Newport, R. I.)

Wallingford, Conn.—Report of the Board of Electrical Commissioners for the Borough of Wallingford for the year ending July 31, 1920. (Apply to Charles E. Bellets, Secretary, Wallingford, Conn.)

Milwaukee, Wis.—Report of the Pension Laws Commission of the City of Milwaukee. Nov. 15, 1920. (Apply to Ernest W. Heller, Secretary, Pension Laws Commission, Milwaukee Wis.)

CULVERTS

Round

Half - Round



The increased production of the new factory of the Newport Culvert Company is carried to all corners of the United States by railroad, steamship, motor truck, etc. The round and half-round type of non-corrosive corrugated culvert will be found in cities, towns, counties, under streets and highways, and carrying drainage beneath railway tracks. Complete data on corrugated culverts will be found in our literature sent free on request.

Newport Culvert Co.

542 West 10th St.

Newport, Ky.

Methods, Materials and Appliances

News for Boards of Public Works, Engineers, Contractors, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

Water Meter No. 2,000,000

On Wednesday, November 24, 1920, the Neptune Meter Company, 50 East 42nd Street, New York City, completed the unequalled and unparalleled record of manufacturing and selling in less than 28 years 2,000,000 Trident water meters. This record indicates the rapid development of the water meter industry and the appreciation of municipal water departments and water companies of the absolute necessity of selling water by meter, and furthermore indicates the appreciation of water-works officials for the Trident meter.

Trident meters are well and favorably known in practically every city, town and village of the United States. The product is so designed and constructed that it renders an efficient and satisfactory service with a nominal up-keep expense. Its accuracy and durability have been firmly established.

The Neptune Meter Company was organized in 1893, and during the first year sold 6,022 meters. As indicative of the progress of this company, the following table of yearly sales is of interest:

Year	Number Sold	Year	Number Sold
1893.....	6,022	1907.....	66,669
1894.....	4,394	1908.....	82,398
1895.....	6,786	1909.....	109,217
1896.....	7,201	1910.....	118,054
1897.....	9,782	1911.....	112,386
1898.....	14,114	1912.....	121,525
1899.....	17,379	1913.....	132,025
1900.....	20,095	1914.....	124,029
1901.....	31,260	1915.....	125,620
1902.....	41,614	1916.....	127,252
1903.....	41,394	1917.....	122,249
1904.....	36,274	1918.....	121,549
1905.....	66,427	1919.....	132,663
1906.....	63,583	1920.....	156,000

A New Truck Tire Tread

Much scientific and technical interest is being centered in the "Cross and Square" tread tire developed recently by engineers of the Firestone Tire & Rubber Company, of Akron, Ohio. The tread is somewhat of a departure from all the old ideas in tread designing. It was in the process of development many months before actual production was begun in the Firestone factory.

The Cross and Square is said to be a highly developed combination of all the advantages contained in the former tread types. It is stated that all the minor disadvantages heretofore encountered in tire building have been practically overcome in its building.

The basic idea behind the whole design is the elimination of localized tension at any point on the tire, according to the engineers

who perfected it. A plain square stud design permits the running of "breaks" straight across the tire, thereby causing a tendency for the tire to bend at this point. The resulting hinging action in the breaker and fabric under this weak spot causes separation and breaking down of the tire.

The Cross and Square tread is zigzagged in such a manner that recesses cannot run for any considerable distance in one direction. At the same time the numerous different angles offer greater traction resistance and anti-skid effect.

It is claimed for the new design that, beside the equal distribution of action over the tire and the balance of pressure, the extra rubber required in the finishing of the design affords greater traction power, especially on slippery pavements or muddy roads. Special features are being added to the design for use in the construction of truck tires, it is said.



A NEW TYPE
OF TREAD

A Commercial Register of the United States

The 1921 edition of Hendricks' Commercial Register of the United States for Buyers and Sellers has just come off the press. An examination of the book shows that the publishers have maintained the same high standard which has been acknowledged for the past 29 years and have retained all the good features which have marked this publication and also added some new ones. The book is arranged very simply, with a complete index, convenient for business men and municipal officials.

This book is particularly valuable, inasmuch as with the great reorganization of business following the war many changes have taken place and are still going on, and such an annual publication enables the buyer to check up and be sure just what firms are still in the field. This book is published exclusively by S. E. Hendricks Co., Inc., 70 Fifth Avenue, New York City.

January 1st, 1921,

The

Niagara Metal Stamping Corporation

takes over

the plant and business

of the

Niagara Falls Metal Stamping Works

The High Quality of

Service and Products

upon which the prosperity of the old Company was based

will be Fully Maintained

[and

Added to

in the interest of

Present and Prospective Customers



CRACKED HOSE, SHOWING WHERE HOSE OF OLD CONSTRUCTION CRACKS BECAUSE OF FLATTENING

Rebuilding Fire Hose

The Bi-Lateral Fire Hose Company, 326 West Madison Street, Chicago, Ill., reports that its improvements in the construction of fire hose have been so generally accepted that it is making over into Bi-Lateral hose thousands of feet of hose of the old construction purchased at the same time with Bi-Lateral. Many sections of the old-style hose are being salvaged, as shown in the illustration, thus saving cities approximately 50 cents a foot over the cost of new hose.



REHABILITATED HOSE, SHOWING OUTER JACKET IN GOOD CONDITION WITH A NEW INNER JACKET, BI-LATERALLY CONSTRUCTED

Engineering Work for Louisville, Ky.

The Edmund T. Perkins Engineering Company, 1211 First National Bank Building, Chicago, Ill., has been engaged, in conjunction with W. N. Brown of Washington, by the city of Louisville, Ky., to make topographical surveys and maps for use in its city planning, grade crossing elimination and sewerage.

Waging the Fight Against Climbing Caterpillars and Worms

A new tree band, made of heavy water-proof paper with a sticky, repellant material under the umbrella-like canopy, has been developed by the Eggert Chemical Company, Canton, Ohio. This canopy, which provides positive protection and lasts for an entire season, protects from the weather the gum on which the climbing worms, caterpillars, etc., are caught, and also keeps dirt, dust and falling leaves from accumulating on it. It is claimed that no climbing caterpillar or insect can pass this sticky material, as it catches them and holds them as soon as they set foot upon it.

Attached to the band on the inside is a strip of fluffy felt, which fills up all depressions in the bark and prevents passage under the band. This eliminates the necessity of cutting away the bark, as the felt fills up all of the crevices. The tree band is guaranteed to be effective for the entire season in all weathers and at all temperatures in which worms or insects are active. It is put up in 25- and 100-foot rolls, flat when boxed, and mushrooms out when it is tacked on to the tree. It has been approved by men in the employ of the United States Forestry Service and by the State Forestry Departments of Massachusetts and Connecticut.

Enlarging a Water District

The Sherrill-Kenwood Water District of Sherrill, N. Y., is installing a new water-works plant, consisting of about 700 tons of cast iron pipe, 4- to 12-inch, valves and "Mathews" fire hydrants. This water district comprises the city of Sherrill and that portion of the city of Oneida known as Kenwood, and is mainly populated by the employes of Oneida Community, Ltd., makers of Community Silver.

C. W. Knight & Son, of Rome, N. Y., are the engineers. The pipe, fire hydrants and gate valves were furnished by R. D. Wood & Company, Philadelphia, Pa.

Murdock Joins Cummer

R. B. Murdock, formerly executive engineer of The Asphalt Association, has resigned, and now represents the F. D. Cummer & Son Company, of Cleveland and New York, manufacturers of asphalt paving plants and driers, at 19 West 44th Street, New York City, and will be in charge of Eastern domestic and export sales.



THE MATHEWS FIRE HYDRANT

**REAL EFFICIENCY
AND
ECONOMY
IN
BEAN
SPRAYERS**



Your Park and shade trees Boards will insist that you get efficiency and economy when you select your machine for city spraying. You have features in Bean sprayers that

will satisfy their most exacting demands. Each feature of the 17 special features means that much more towards long life—economy of operation and real results from spraying. Each Bean sprayer is built oversize to stand the gruelling strain of continuous high pressure necessary for your work.

We can satisfy your own idea on the machine you want for your work. A size for every need and a complete line of spraying accessories, guns, etc.

Write today for Catalog No. 34A

BEAN SPRAY PUMP CO.,

**LANSING
MICHIGAN**

**Clear Proof of
TIFFIN FLUSHER
Worth**

Each year finds an ever increasing number of cities using Tiffin Two-Motor-System Flushers.

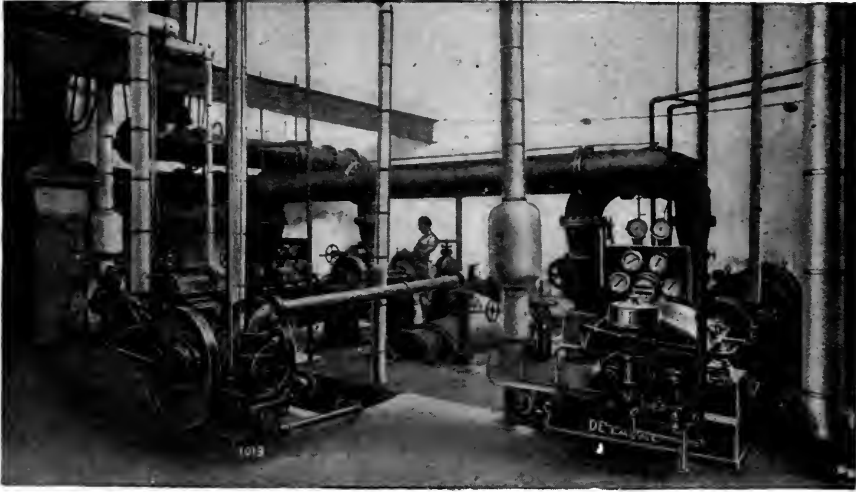
This gives us an increasing number of service records to refer you to.

It is now a simple matter to prove that *Tiffin Machines* do more and better work at a lower cost.

Do you want this proof?

**The Tiffin Wagon Co.
Tiffin, Ohio**





A 6,000,000-GALLON DE LAVAL INSTALLATION

Water-Supply Plus Fire Protection

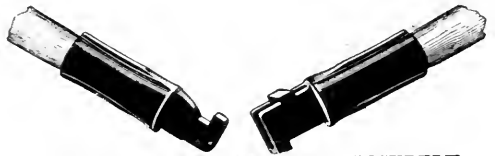
In a statement which appeared in the November issue of *THE AMERICAN CITY*, it was noted that the De Laval geared steam turbine-driven centrifugal pumping unit illustrated herewith regularly delivered 6,000,000 gallons per day against a 378-foot head in domestic supply service, but at an increased speed developed a fire pressure of 343 feet. The normal head against which these pumping units operate should have been stated as 272 feet instead of 378 feet. The duties developed by these steam turbine-driven centrifugal pumps compare favorably with those shown by the best triple expansion engines when the latter are in first-class condition and less subject to falling off, as there is no slippage past valves and plungers in the centrifugal pump and no complicated steam valve gears requiring adjustments to the turbine. The cost of pumping is claimed to be much less with a De Laval unit because of the greatly reduced fixed charges following from the much smaller first cost and lessened costs for building and foundations, also from the lessened expense of attendance and supplies.

Safety Lock Sewer Rods

In using the various instruments which have been developed for removing obstructions from sewers, it is necessary to have a section of rod which can be depended upon to remain locked while in use. The F. Bissell Company, 226-230 Huron Street, Toledo, Ohio, manufacturer of various types of scrapers, screws, plungers, gouges, brushes, claws, root-cutters, etc., for removing obstructions from sewers, has developed a sewer rod with couplings to hold the rod firmly together without slack and without danger of separation in the duct but which easily uncouples when removed. The coupling is simple in design and made of malleable iron to withstand the severe handling to which it is

subjected both in being transported and in the manhole.

The rods are made from second-growth hickory with the couplings swedged or shrunk on very tightly, so that it is practically impossible to pull them off. No rivets are used, thus eliminating the danger of breakage through the wood at rivet holes. Coupling and uncoupling is accomplished very readily and quickly, and when in the duct slack is eliminated between the joints, and the rods cannot possibly uncouple, although they will lend themselves to moderate bends. The rods are light and come in standard lengths of 3 and 4 feet.



SEWER RODS THAT LOCK SECURELY

New Sales Office in Atlanta

The Chicago Bridge and Iron Works, Chicago, Ill., has announced the opening of a new sales office at the Forsythe Building, Atlanta, Ga. Joseph L. Zeller, who has been connected with the company for a number of years, will be in charge and will handle the states of Georgia, Alabama, Tennessee and Florida. This company confines its activities chiefly to the manufacture of elevated tanks, large storage tanks and similar plate work.

Warren Brothers Move

Warren Brothers Company, Boston, Mass., well known as the originators and contracting engineers of Warrenite-Bitulithic pavement, have announced the removal of their general offices on December 31, 1920, to the Parkman Building, 9 Cambridge Street, Boston, Mass.



These two AUTOSWEEPERS, sister machines of the famous ELGIN, do the work of four horse-drawn sweepers and sprinklers.

THE AUTOSWEEPER, as compared with horse-drawn sweeper, covers twice as many miles per day, requires less than half as many men, no regular constant care, less space to house, less units per mile swept.

ON YOUR STREETS, it will be a thing of pride to the city and the department. The large, heavy, *powerful* broom, and the scientific spraying system, leave a dampened ribbon of clean pavement.

Send for Circular No. 44-A

ELGIN SALES CORPORATION

501 FIFTH AVENUE
NEW YORK

U. S. A.

OLD COLONY BUILDING
CHICAGO



The Key to Vigilance

HARDINGE SYSTEM

of

Police Registration

**High Efficiency
Low Cost**

Write for Book—"Key to Vigilance"
HARDINGE BROTHERS, INC.
4147 E. Ravenswood Ave., Chicago



No matter WHAT drinking fountain you may put

INDOORS

← **This**
The MURDOCK
PATENTED

↗ **ANTI - FREEZING** ↖
BUBBLE - FONT

IS THE ONLY ONE THAT IS SAFE
TO INSTAL OUTDOORS BECAUSE

it is the only drinking fountain made that was designed and is built *solely* for outdoor use. It does not have to be turned off at the approach of cold weather.

**THE ONLY FOUNTAIN MADE
THAT IS STRONG ENOUGH
TO WITHSTAND PUBLIC
ABUSE.**

Write for fully illustrated literature to
The MURDOCK MFG. & SUPPLY CO.

**FIRE HYDRANTS
YARD HYDRANTS
HOSE BOXES**

CINCINNATI, - - - - OHIO
Builders of Water Service devices since 1853



A MOTOR-DRIVEN HAND MOWER IN WADE PARK, CLEVELAND

Power and Tractor Lawn Mowers

On large and fairly large lawns and parks, a power lawn mower, such as depicted herewith, is needed. This mower, manufactured by the Ideal Power Lawn Mower Company, Lansing, Mich., is in operation to-day on some of the most prominent lawns in the United States. It is manufactured in different sizes and is especially adapted for hand use. This machine is also manufactured as a tractor-triplex mower, which will cut a swath 84 inches in width and travel at a speed varying from $2\frac{1}{2}$ to 7 miles per hour, cutting as much as 25 acres of lawn per day. Unlike other triplex lawn mowers, it is easy to manipulate and turns about in its own length.

Sanitary Drinking Fountains

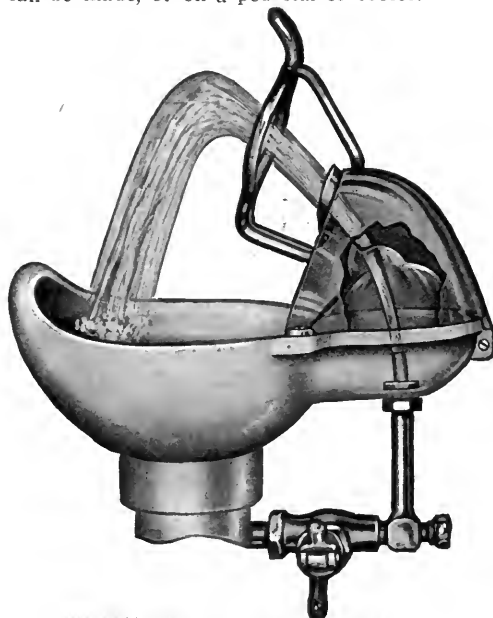
One of the most recent developments in the sanitary drinking fountain field is the Liberty Puro Fountain manufactured by the Puro Sanitary Drinking Fountain Company, Haydenville, Mass. This is constructed on the principle that a fountain, as a medium for supplying uncontaminated water, must above all things be sanitary, and special stress has therefore been laid on nozzle protection.

Bacteriological investigation has shown that infection readily takes place when water falls back from the drinker's mouth into the nozzle. This occurs in some oblique jet fountains as well as in the straight vertical bubblers when the nozzle is left unprotected. Mucus from mouth or lips, drippings or splatterings, however small, that can reach the nozzle are sufficient to produce infection.

To remedy these defects in side-stream fountains, means have been found by the engineers of the Puro Sanitary Drinking Fountain Company to so isolate the nozzle as to make it almost impossible to contaminate the stream. The nozzle of the Puro Liberty Fountain is completely out of sight of the drinker and is protected by three guards in three different

ways, namely, a face guard, a hood guard and an inner shield guard. All of these in turn afford such protection to the nozzle as to make it practically impossible for any foreign substance to reach it except through malicious intent.

The accompanying illustration shows the type of fountain and the special protection given the nozzle. The bowl and hood are of iron base covered with vitreous china enamel. The face guard, faucet and connections are made of solid and durable cast bronze heavily nickel-plated. There is practically nothing to get out of order, and the fountain is fool-proof. It can be mounted anywhere that connections can be made, or on a pedestal or cooler.



A TYPE OF PROTECTED SANITARY DRINKING FOUNTAIN

ANNOUNCEMENT OF SPECIAL INTEREST TO ALL PUBLIC OFFICIALS HAVING TO DO WITH PUBLIC UTILITY PROBLEMS

Believing that public officials and other readers of "The American City" who are confronted with public utility problems will be interested to know of the organization, recently, of the American Public Utilities Bureau, we submit below a brief statement of the purposes for which it was established and an outline of the scope of work which it is prepared to undertake.

The American Public Utilities Bureau was organized because it was felt that such an institution was needed in view of the fact that this is the most critical period in the adjustment of the public relations of all the utilities. It will be a national agency for counsel and expert service on all public utility problems. The American Public Utilities Bureau believes in a square deal for all groups concerned, but is pledged to the idea that public utilities are primarily for public service.

With respect to scope of work, we are prepared to take hold of any kind of a street railway, motor bus, gas, electric, water or telephone problem, as we have associated with us specialists of the highest professional standing who are thoroughly equipped with the necessary technical and practical knowledge and experience.

Last, but not least, it is one of the primary purposes of the American Public Utilities Bureau to enable public officials and others who are in need of such services to secure at the lowest possible expense the all-around preparation of their particular cases, which is highly essential if the public rights are not to be sacrificed in the present confusion in the utility field.

Descriptive bulletin sent on request

**SURVEYS
FRANCHISES
CONTRACTS
ARBITRATION
TAXATION
LEGISLATION
OWNERSHIP**

American Public Utilities Bureau

An Association of Experts for Service to the Public
ACCOUNTING—ECONOMICS—ENGINEERING—LAW

**175 FIFTH AVENUE
NEW YORK**

**SERVICE
RATES
ACCOUNTS
VALUATIONS
LABOR
ADMINISTRATION
RESEARCH**

TRANSPORTATION

LIGHT

HEAT

POWER

WATER

COMMUNICATION

Lead as Material for Jointing Cast Iron Pipes

The question of an efficient jointing material for bell-and-spigot pipe has caused much discussion among engineers and water companies in the past, and a correct solution has not yet been definitely reached. The growth of the different systems in the last twenty years has been so rapid, and distribution problems have become so complex, that a material which was considered satisfactory for jointing cast iron pipes a few years ago has outlived its efficiency. New methods have come into existence, and each engineer of distribution has his own ideas on the subject, being quick to advance his favorite material and defend it as the occasion may arise.

The following interesting discussion of lead joints vs. lead wool for water-mains is furnished through the courtesy of the United Lead Company, 111 Broadway, New York City.

The coefficient of expansion of iron at ordinary temperature is .00001061. This means that if a bar of iron is heated so as to have a temperature one degree higher than originally, it will increase its length a little over 1/100,000 of its length. Conversely, when the same bar is cooling, it will increase the same amount in length if it goes through the same range in temperature.

The coefficient of expansion of lead is .00002924, and when its temperature changes one degree Centigrade, its length increases or decreases almost 3/100,000 of its original length. When lead is poured into a joint, it must be at least at 327° Centigrade, for it does not melt until this temperature is reached. Of course it is necessary to have it greater than this temperature or it would chill too quickly.

In a 3-inch pipe the distance from the outside of the pipe to the inside of the socket is 0.4 inches. The temperature cools down to ordinary temperature, say, 40° Centigrade, which is a drop of 287° Centigrade. Therefore, $.4 \times .00002924 \times 287 = .0034$ inches, which is the actual distance that the lead shrinks away from the socket in the joint of a 3-inch pipe. In larger sizes where the distance between bell and spigot is greater, the shrinkage is greater.

Some people state that this shrinkage is taken care of when the finished joint is calked once around. True, the lead has spread somewhat, but with a hand- or air-hammer it is impossible to exert enough force on the calking tool to spread the lead any deeper than 1/4-inch. Furthermore, if the joint is hammered too vigorously, the bell of the pipe may break. This contact, which is only 1/4-inch wide around the whole pipe, is soon destroyed altogether when the pipe is jolted the least bit. It is true that the iron of the socket also increases in size because of expansion when heated by contact with the hot lead. It stands to reason, however, that the iron does not attain such a high temperature as the lead and consequently does not have so great a drop in temperature as the lead. Even if it did expand and contract just as much as lead, the lead would still

be there, because the spigot would also expand and finally contract and pull away from the lead. It may be argued that these slight differences are so small that they may be ignored, but in order to have a better idea of the shrinkage on a 3-inch pipe, it might be appropriate to say that a fairly good quality of Japanese linen paper is just .003 inches thick. Thus it is readily seen that after a cast lead joint has cooled, there is an opening as thick as paper around the whole joint. If the pipe is pressed to one side, the opening in the opposite side of the pipe is doubled in size.

If lead wool is used for calking a joint, no heat is applied in any manner. First, a layer of good quality oakum is calked tight, then the wool is calked from one to four strands at a time, depending on the size of the joint. In the first place, the lead interlocks with the strands of the oakum and makes a perfect bond between the two materials. The wool is driven in so tight that it enters every corner of the joint. Its texture after calking is fibrous, and, being so, is elastic to a certain extent. Calking lead wool with an air-hammer has never been known to crack the bell. Some contend that this is due to a certain elasticity in the lead wool. With a lead wool joint a greater deflection may be allowed for the pipe after calking than with cast lead. The latter forms a mass which is easily distorted, but the lead wool makes a solid mass in the whole joint, which is much less susceptible to this distortion. The shrinkage of the cast lead gives the pipe a small amount of "play," but when the joint is entirely filled with lead wool, the pipe has no encouragement to make this start. With cast lead the start is already made as soon as the joint is cold.

Cast lead must be poured in a perfectly dry joint, otherwise there will be trouble, which usually results in a painful burn or an injured eye. Lack of any chance for such an accident is evident in lead wool, and, furthermore, the joint can be calked when in a wet trench, or when there is dampness in the joint itself. A leaking water or gas pipe may be repaired with lead wool while the water is leaking. The only necessary precaution for calking with lead wool is to keep oil and dirt out of the joint.

It requires a more or less skillful man to pour lead joints, but lead wool can be calked by an ordinarily intelligent laborer who will do as he is told. Consider the disadvantage in moving a lead pot along a trench, and contrast it with the advantage of carrying a reel of lead wool out on the job and having no bulky apparatus to move along.

If automatic hammers are used, the gasoline-compressor is carried on a truck alongside the trench. What more convenient method for laying cast iron pipe? The air-compressor can be used also as a tamper when attached to the proper tools. It can also serve as a means for detecting leaks in the pipe. Every joint should be tested under high air pressure to insure a perfectly calked main. Lead wool has been calked successfully under water by a diver.

Estimates of Cost of Proposed Work
Reports on New Improvements
Preparation of Plans
Supervision of Construction

Dams and Reservoirs
Pipe Lines
Filtration Plants
New Water Supply Systems

JAMES P. WELLS
HYDRAULIC ENGINEER

Main Office

249 Cutler Building, Rochester, N. Y.

Branch Offices

In the South, Central West and Canada

New Sewage Ejector Operating Valves

In its constant endeavor to improve the operation of mechanical equipment used in sewage disposal, the Pacific Flush Tank Company, 4142-43 East Ravenswood Avenue, Chicago, Ill., has placed upon the market a new sewage ejector valve, known as the Cox Operating Sewage Ejector Valve. This valve which will be used in connection with the Pacific Flush Tank sewage ejectors is controlled by an open float instead of the former type of closed float. The valve is very simple, with few parts exposed to wear. This operating valve is a simple mechanism, the actual wearing parts consisting of two standard cup leathers which can readily be replaced quickly by purchase in any city. The difficulty with earlier valves used in the control of sewage ejectors was in the complicated wearing parts, which caused the ejector to be out of commission most of the time. The simplicity of the new valve and its ease of maintenance, together with the advantage of



A VALVE FOR OPERATING SEWAGE EJECTORS

the open float, as compared with the old type of closed float, makes for a very reliable and efficient ejector.

A Fountain Ruling Pen

Draftsmen in city engineers' offices and others who make use of ruling pens in the preparation of plans, diagrams, charts, etc.,

will be interested in the "Minerva" fountain ruling pen, which has recently been placed on the market by Kolesch & Company, 138 Fulton Street, New York City. This pen is so arranged that it can be used with any ink, and one filling will do for a day's work. It differs from most pens of the ruling type in that it will not leak or clog. It gives the user his entire time for concentration upon his work. In using the pen as depicted, it is unscrewed from the handle, which is then filled with ink. In order to fill the pen point, the top is pressed gently to admit the small amount of ink necessary for the work immediately at hand.

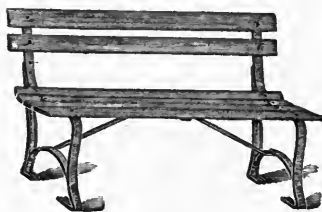
Reorganization of Metal Stamping Company

Announcement has been made that the well-known firm of Niagara Falls Metal Stamping Works, Niagara Falls, N. Y., on January 1 effected a reorganization with Charles R. Robinson, formerly Vice-President of the Lackawanna Steel Company, as President, and Eliot Armstrong, who was associated with him in that company, as Vice-President. The name of the company has been changed to Niagara Falls Metal Stamping Corporation. This company was originally founded in 1897 by R. C. Eldridge and has been well known in the stamped metal field in the production of house numbers, street name signs and license tags.



Park Benches

This illustration shows a 370 Special Settee, a design of the Stewart Iron Works Company, Cincinnati, Ohio. This settee is con-



A SPECIAL TYPE OF PARK BENCH

structed with wood slats and channel iron frame. It is a design that has been adopted by many of the leading parks throughout the country.

MANY COMMUNITIES SEEM TO HAVE A SIMILAR VIEWPOINT

A farmer wished to insure his barn and a few stacks.

"What facilities have you for extinguishing a fire in your village?" inquired the superintendent of the insurance office.

The man pondered a little while. Finally he answered, "Well, sometimes it rains."

—*Christian Register.*

THE ONLY WAY

To Obtain an Ornamental
Lighting System and
Retain Overhead
Wires

ELRECO COMBINATION POLES



Bracket 10347 and
C. E. Novalux Unit Form 4



Combination Pole
and
Ornamental G. E.
Luminous Arc

serve the double purpose of Ornamental Lighting Standards and Trolley Wire Supports.

Handsome brackets for supporting very latest Novalux Lighting Units or the Ornamental Luminous Lamps improve the appearance of the plain Trolley Poles.

You can string your wires along the top of the poles, where they are practically unnoticeable and out of the way of traffic.

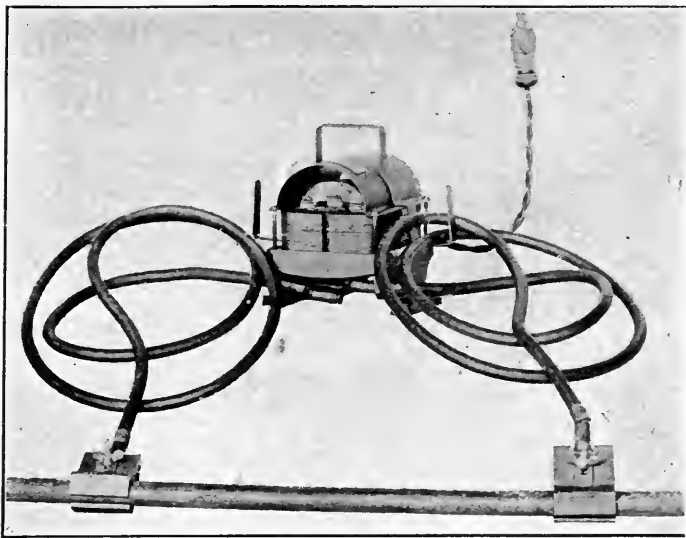
You save the cost of additional lamp standards and underground construction, and avoid further obstruction of the curb line.

Catalog F describes this money-saving plan and full details—free.

Electric Railway Equipment Co.

Cincinnati, Ohio

New York Office—30 Church Street



A PORTABLE SERVICE THAWING DEVICE USING HOUSE CURRENT

Thawing Frozen House Services

Through a new device, just developed by the General Electric Company, frozen water pipes may hereafter be thawed out electrically. The apparatus which does away so effectively with the annoyance of using hot cloths, and other methods, may be attached to a lamp socket, and in a few minutes the water returns to its normal circulation. The device consists of a transformer, 10 feet of cord for connection with the lighting circuit, and secondary connections for attachment to the pipe. The transformer adjusts the lighting voltage to a point where the current will produce enough heat for thawing. It uses about as much current as is consumed in operating an electric flat iron.

In thawing out a pipe, the nearest faucet should be turned on and the secondary leads of the pipe thawer connected nearest the street. Pipes should be heated in sections until the water starts to flow out of the faucet. The length of time it will take to thaw a pipe depends first upon the degree to which it is frozen, the size of the pipe, and the length of the frozen section. Under most conditions thawing may be very economically done with the pipe thawer and without the customary fire hazard incurred by the use of the blow torch.

The portable Wayne Pipe Thawer weighs 35 pounds complete. It is a valuable adjunct to the equipment of plumbers, and furnishes central stations with a means of helping their customers out of difficulties in a manner that is much appreciated.

From War-Time Revetments to Modern Pavements Resiliency Is Paramount

The first few days of Germany's rush upon Belgium taught the Belgians and their allies one lesson of immeasurable value: that forts

of stone and concrete could not withstand the terrible impact of the enemy's giant explosives. As the result of this lesson, they dug themselves trenches in the earth and erected parapets of sand-bags to absorb the impact of the monster shells and to reduce their shattering effect to a minimum.

General Jackson applied the same principle in the war of 1812; only instead of using sand-bags, he employed bales of cotton to withstand the shells from the British men-of-war. The cotton-bales absorbed the impact and withstood the shattering effect of the explosives better than rigid forts!

The great service given by sand-bags to the Belgians and by cotton-bales to General Jackson was rendered through their ability to absorb impact. It might be said too, that their quality of resiliency, while not so pronounced as those of a material like rubber, was of considerable significance in withstanding the shattering effect of the explosives. All materials that are compressible have qualities of resiliency, and the ability of the sand-bags and cotton-bales to resume their original form after sudden and terrific impact was of no little consequence in their great service.

From war-time necessity for shock-absorbing and resilient materials, we may turn readily to commercial and civilian demand for materials having these same qualities. For instance, materials having resilient and shock-absorbing qualities must be used in the following: rubber tires—either solid or pneumatic—for automobiles and motor trucks; rubber heels for shoes; golf balls that withstand incessant banging; and roads and pavements that undergo terrific traffic.

Toughness in a rubber tire is a necessary means to its longevity of service, but its quality of resiliency is just as important, the same as it is in a pavement. A rubber tire upon striking obstacles, whether in the form of a rut in a road or a rock or stone, must be able to resume its original form and shape after the impact.

The manufacturers emphasize the idea that zinc oxide in rubber tires helps perfect the all-important feature of resiliency in the tires. They do this knowing the significance of the tire's ability to return to its original form after encountering obstacles.

The manufacturers of rubber heels emphasize the same quality of resiliency in their product, and of necessity must apply the same principle as do the manufacturers of rubber tires.

And does not the same hold good in the

King Lighting & Trolley Pole



We are prepared to furnish complete combination lighting & trolley pole equipment including brackets & Novalux units

To those interested in modern & economical street lighting, we will send our illustrated booklet. Send your name and address.

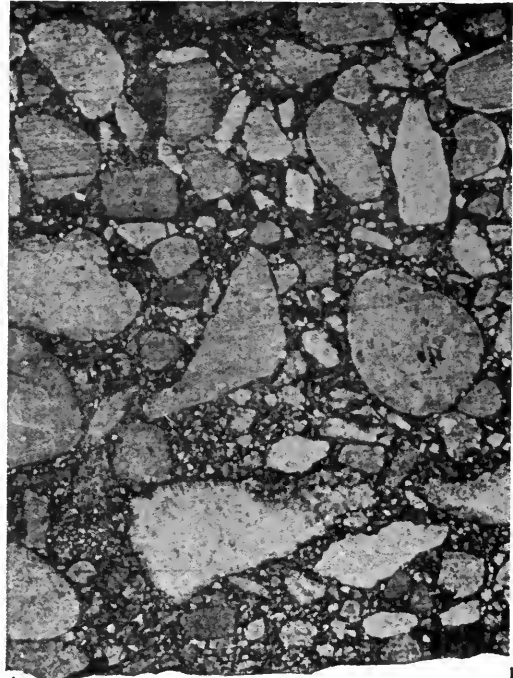
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THE PROOF OF THE PUDDING



Sawed Section of Warrenite-Bitulithic Pavement
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Surface and 2¼ In. Foundation

Warrenite-Bitulithic City Pavements and Country Roads have been laid on bituminous concrete base so very extensively during the past ten years as to prove beyond a doubt its efficiency and superiority under all conditions of climate and traffic.

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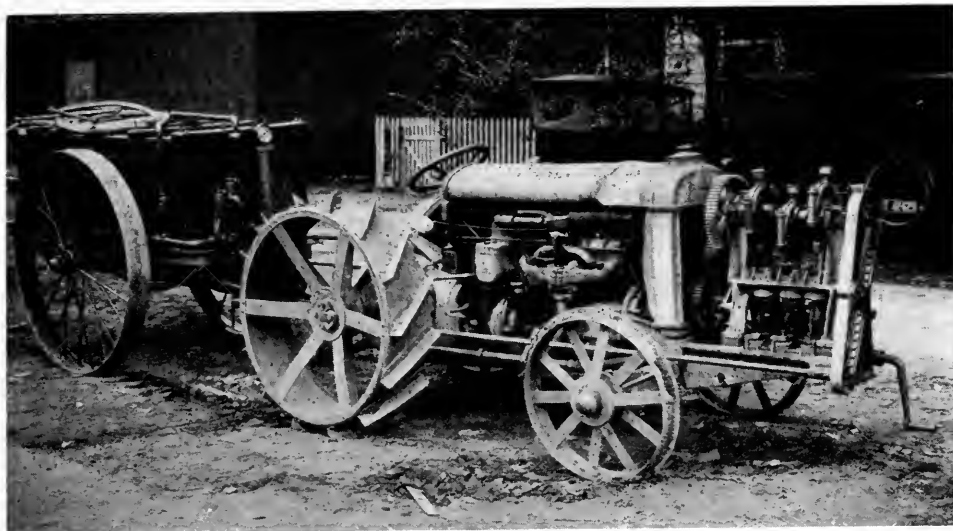
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A COMPACT SPRAYING OUTFIT FOR MUNICIPAL PARKS AND STREET TREES

production of golf balls? Think how long a piece of stone or concrete would last under the incessant pounding which a golf ball must endure. A very short time, to be sure! The reason why the golf ball lasts is that in addition to being tough, it is also resilient. The stone or concrete, too, may be tough, but its lack of resiliency results in its breaking.

Eminent engineers consider resiliency of prime importance and infinite value in the construction of roads and pavements. The same principle holds good with these as with the shock-absorbing and resilient sand-bags and cotton-bales of war-time, and the resilient and shock-absorbing rubber tires, rubber heels, and golf balls of peace-time commercial life. The inability of too rigid, non-resilient pavements to "iron themselves out" under terrific modern traffic is the reason for this general belief among engineers.

Experiments begun by Government experts to determine the destructive effect of impact on pavements and to find a remedy, show some striking results. Results now announced show that a weight of 7,750 pounds on the wheel of a truck moving at a speed of fifteen miles per hour, becomes 43,000 pounds in its destructive effect if the wheel has a drop of one inch. Such a drop is very readily caused by any small obstruction or crack in the pavement. In solving the impact problem engineers use an asphalt cushion course. The cushion will absorb the shock so as to reduce the shattering effect of impact on the foundation.

Expenditure for construction and maintenance of highways outside of cities is now averaging some \$500,000,000 a year.

New Jersey Buys Snow-Plows

The Good Roads Machinery Co., 813 Bulletin Building, Philadelphia, has delivered 52 Champion snow-plows to the State Highway Department of New Jersey.

A Sprayer with Tractor

The spraying outfit shown above is manufactured by the Bean Spray Pump Company, San Jose, Calif., in two sizes, the regular equipment of the larger size including a super-Giant pump with 3-inch cylinders and a capacity of 15 gallons per minute at 50 r.p.m. The pump is directly connected to the Fordson engine, with spiral jaw clutch so placed as to make it possible for the operator to move the tractor without running the spray pump.

The operation of connecting the pump is simple and is accomplished by a rod extending back to the driver's seat. A tank of 300, 400 or 500 gallons capacity is carried as a trailer behind. Two lines of hose and two guns are furnished with the outfit.

The smaller rig has a Giant triplex pump mounted exactly as in the larger outfit. The regular equipment consists of a 200-gallon tank with an option of a 300-gallon tank. These outfits have been operated in the field for a whole season and have been found entirely satisfactory for use by commercial growers. They are admirably fitted for municipal service in spraying park trees and those located along the thoroughfares.

The Bean Spray Pump Company also has a factory at Lansing, Mich., in charge of H. C. Lisle.

Record Purchase for Fire Department

The city of Indianapolis, Ind., has just awarded to the Stutz Fire Engine Company of that city what is reported to be the largest single order ever placed with one company at one time for fire apparatus. The order consists of twenty-five pumpers and ten city service trucks to be delivered to the Indianapolis Fire Department within the next month.



"PIONEER"



HIGHEST QUALITY ASPHALTS

Any Melting Point

Any Ductility

Any Penetration

PIONEER Mexican Asphalts and Compounds are different: less susceptible to heat and cold, and will comply with the strictest ductility requirements.

"PIONEER"

RUBEROAD CEMENT

It's New

It's Different

It's Efficient

It sticks to concrete like molasses sticks to the fingers. It acts like liquid rubber and will last longer.

THE PIONEER ASPHALT CO.,

Lawrenceville, Ill.

PENNSYLVANIA

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Quality and Service Supreme

Pennsylvania Cement Co.

30 E. 42 St., New York City

Repair Your Streets with THE LUTZ SURFACE HEATER

It softens asphalt and other bituminous pavements. It vulcanizes the old and new material into a perfect bond. It cements Asphalt on Granite, Brick, Cobble, or other hard pavements. It makes re-surfacing and maintenance easy and inexpensive.

Illustrated Particulars on Request

Equitable Asphalt Maintenance Co.
1901 Campbell St. Kansas City, Mo.



Repairing an Asphalt Pavement. New York

**HAVE YOU
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the lists of valuable catalogs on pages 4 and 6? A careful study of these pages will be of help to you in locating the machinery, materials or apparatus you want.

**CATALOGS
YOU NEED**

VOLUME XXIV

NUMBER 2

The American City

NEW YORK
FEBRUARY,

1921

The Motor Vehicle Highway Creed

By D. C. Fenner.

Systems of Highways

I BELIEVE in

A Federal Highway System;

A state highway system in every state connected with the Federal Highway System.

Establishment of Highways

I believe that

Federal highways should be constructed, maintained, paid for and controlled by the Federal Government;

State highways should be constructed, maintained, paid for and controlled by state governments;

County highways should be constructed, maintained, paid for and controlled by county governments in conjunction with and under the supervision of state governments.

Selection of Routes for Highways

I believe that

Routes for the highways of these systems should be selected with the sole view of meeting the highway transportation needs of the nation, its states and their counties.

Structural Standards for Highways

I believe that

Federal, state and county highways should be free from grades of more than 5 per cent; should be free from sharp turns; should be laid along the shortest route between centers of distribution and not through the main streets of all the towns along the route; and should be free from crossings at grade with railways or other highways. A modern hard-surface highway should be wide enough to provide for two streams of vehicular traffic 96 inches wide. This means a road paved to a width of at least 20 feet,

and the total width between inside edges of ditches should be not less than 30 feet. At points of congestion shoulders of proper width should be provided. Highway bridges should be of 20 tons capacity with a clear width of roadway of not less than 24 feet.

Bridge and highway structures should be strong enough to support wheel loads of 11,200 pounds distributed not more than 800 pounds per inch of tire width, said width in the case of rubber tires to be measured between the flanges of the rim, and axle loads of 22,400 pounds with a minimum distance of 4 feet between axles.

They should further be able to support vehicular units of a maximum weight of 28,000 pounds and durable enough to provide throughout their entire length and breadth smooth and economical transportation at all seasons of the year.

The highway surface must be of such a nature that it is weather-proof and dependable under severe usage. It must be wear-resistant, so that extensive or frequent repairs are not necessary, and quick to repair without interruption of traffic and with simple tools and materials; low in tractive resistance; offering a good foothold for horses and rubber tires and yet smooth enough for good speed.

This country needs roads; it cannot prosper without them. But it cannot have them as long as its highway officials continue the practice of laying road-surfacing materials on an unprepared foundation and calling the result—a road. Roads which will resist the attack of the elements will stand the heaviest traffic without injury; roads which will not resist the elements are the cause of our

present great concern over an unfortunate waste of money.

It is no longer possible to adopt one specification for the entire length of a road. Each foot of subgrade conditions must be analyzed, the subsoil must be properly drained so that water may be kept off, out of, and away from, the road and its foundations. A proper foundation to meet the conditions at any particular point can then be laid. Give a wise builder a contract for a building from Philadelphia to New York; tell him that there must be no breaks, that the whole structure must settle uniformly and evenly throughout its length. Will his foundations all be alike? The building of permanent roads is certainly a foundation proposition with proper attention to drainage and to subsoil conditions.

Maintenance Requirements for Highways

I believe that

Federal, state and county highways should be constantly maintained in conformity with the minimum structural standards prescribed for them and that in winter-time main-line highways should also be kept reasonably free from snow and ice for motor vehicle traffic.

Financing of Highways

I believe that

The construction of Federal, state and county highways and their establishment as connected and coördinated systems will bring into being improvements of infinite value to every man, woman, and child in every walk of life, and should therefore be a general charge against all citizens.

The maintenance and administration of Federal, state and county highways should be placed upon the users thereof in proportion to that use.

Highway construction charges should be financed on the pay-as-you-go policy, if possible; otherwise, by bonds to be retired within the life of the improvements.

Highway maintenance and administration charges should be financed on a cash basis from current assets.

Administration of Highways

I believe that

The administration of Federal, state and county highways should be vested in officials of the highest integrity and ability; should be absolutely divorced from politics and political considerations and have unrestricted freedom to function in the best interests of the public as a whole and that portion of it which owns and operates motor vehicles.

Oil on the Troubled Sands

Shifting sand dunes which cover up a highway soon after it is completed have formed a serious obstacle to improved road building in some parts of the country, particularly in the Northwest. To remedy the evil, the Bureau of Public Roads of the United States Department of Agriculture has employed a more extensive application of the agency that has been used in the past to lay dust on ordinary highways—oil.

Fifty-three miles of construction of the Columbia River Highway from The Dalles eastward lies through sandy country, in many places of a volcanic ash as light as flour. As fast as cuts are opened up and fills made in this light soil the wind whips out the fill slopes, and sand dunes creep into rock cuts, completely blocking the road. Oil is the only agency yet found to stop the trouble. The equipment used to

spray the crude oil consists of two supply tanks, or drums, in which the oil is carried from the storage tank at the railway siding, and a tractor, which draws the oiling rig and supplies the steam through a hose to the compressor tank, which is carried on a trailer. The oil is heated by the steam and forced through a hose with a nozzle consisting of a half-inch pipe. The steam atomizes the oil and sends it in a fine spray for 100 feet or more, depending on whether the spray is projected in the direction of the wind or against it. For obvious reasons, spraying is usually carried on in the direction of the wind.

Where sufficient oil is used, this means of controlling the sand dunes is very effective, and it is believed that the cost will not be excessive, though exact figures are not obtainable at this time.

Central Mixing Plant in County Road Work

By K. C. Wright

Resident Engineer, State Road Commission, Brigham City, Utah

THE contract to construct nine miles of state road from Brigham City to the Utah Hot Springs, both in Box Elder County, Utah, was awarded in May, 1919, to the Phelps Construction Company by the Utah State Road Commission. This piece of road skirts the western slope of the Wasatch Mountains and is part of the state highway, extending north from Salt Lake City to Idaho and other sections. It is, in fact, the only highway through the southern end of Box Elder County leading from central Utah to the state on the north. The Wasatch Range descends rapidly on its western slopes to the shores of Great Salt Lake. The change from the rocky foothills to the swamps adjoining the lake is made at some places in a very few hundred feet, leaving only room enough for one highway.

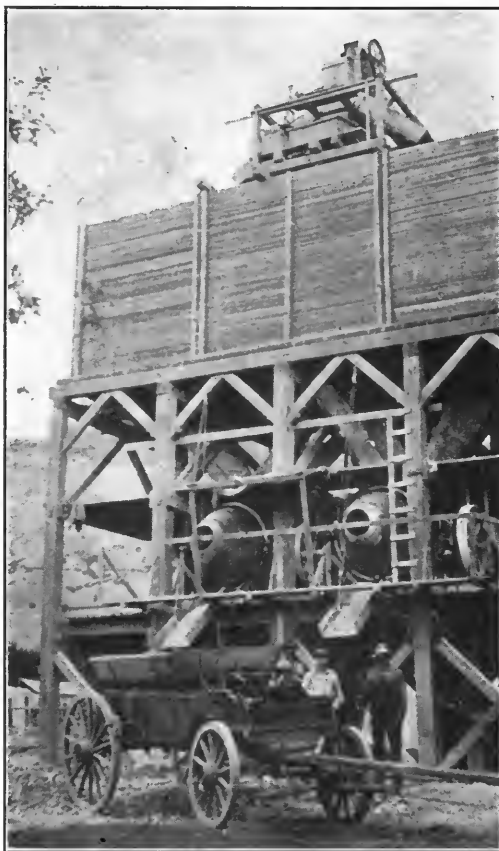
The traffic over this road is, by reason of its peculiar location, very heavy. Plain concrete 6 and 8 inches thick and 18 feet wide was chosen as the type of hard surface best adapted to meet the conditions.

The contracting company started actual paving work in August, 1919, and almost immediately encountered labor troubles. Silt developed in the sand to such an extent as to require washing. Cars for shipping cement became scarce, and a multitude of other troubles hindered the work, so that at the close of the season, on November 1, 1919, only about three-fourths of a mile out of the nine miles had been completed.

The Change to the Present Method

The contracting company saw that a change from the old way of road building was compulsory and so decided upon the method which is now being used and which has proved a success in many ways. It is, to say the least, a very great improvement over the use of the old highway paver with its mile of aggregate on the subgrade and its other inherent weaknesses.

The central mixing plant has been used this year. After mixing, the concrete is delivered to the subgrade in trucks, spread by means of a horse and a special scraper



THE CENTRAL MIXING PLANT IN BOX ELDER COUNTY, UTAH

and finished with a finishing machine.

The plant is equipped with two 1-yard mixers, each operating independently of the other. Storage is provided, by means of overhead bins, for enough sand, gravel and cement for a half-day's run. The prevailing idea which governed the design was to insure as far as possible steady operation, and this has been realized so far as the mixing plant is concerned.

Many sizes and styles of trucks have been tried, but the 2½-ton truck has proved most successful. Each truck is required to haul two batches of mixed concrete, one batch being dumped from each mixer as the truck

comes into position. A two-batch (10-bag) load seems to slip from the truck better than a larger one, and is very much easier to handle on the grade. Trucks of this size and capacity travel faster than the larger ones, and make better time both loaded and empty.

The state specifications require that the concrete shall be in place within thirty minutes after mixing, and it has been possible to haul the concrete a distance of four miles and keep under this time limit. Very much better results have been obtained where the haul has not exceeded two miles, and from observing results obtained in both cases, the writer has come to think that specifications permitting the use of a cen-

tral mixing plant should limit the distance over which the mixed concrete is hauled by truck to two miles, as well as limiting the time to thirty minutes.

It has been our experience that materials will separate on the long haul to such an extent as to cause a serious condition, despite the fact that we have used a relative consistency not higher than 1.05, and a rough mix, based upon the maximum size of the aggregate.

Good speed has been maintained, the average for the summer's run being nearly 500 linear feet of road per day, with the haul varying from a few hundred feet to four miles. The maximum run, to date, is 678 feet in 8 hours.

Economical and Sanitary Problems of American Cities

By George C. Whipple

Professor of Sanitary Engineering, Harvard University

MANY thoughtful people to-day are pessimistic as to the future of all large cities, believing them to be physical monstrosities and economic absurdities. As cities grow in size they tend to lose individuality and become alike. Financially, their life depends upon their growth. Anticipation of growth demands extensive public works, and in recent years these have led to increasing per capita municipal debts and taxes. On the other hand, parsimony is not economy, and preparedness is as necessary in sanitation as in war.

It has been my fortune lately to travel in the Orient, and one cannot observe the dense populations there, the reduced natural resources of the land, the lack of animals, and the universal use of human excrement as a fertilizer, without reflecting on the awful waste of nitrogen, which is taking place in the cities of our western civilization, and without wondering what may be the food conditions in America a number of centuries from now. It is not a pressing problem, that of utilization of nitrogen and fats in sewage and garbage, but it is one which should be kept in mind. We throw sewage with its nitrogen and fats into the sea because at the present time it would cost more to recover these substances than they are worth in the market.

That may be economically sound, but, nevertheless, it is a waste which some day must be corrected.

In small communities, comfort, which implies health and agreeable conditions of life, can usually be procured at a reasonable cost. In large cities, comfort can also be procured, but only at increasing cost. The question for any community to solve is this—can comfort be secured at a cost which the people can afford to pay? If the limit is approached, will it mean abandonment of comfort in order to maintain solvency? Will it mean repudiation of debts? Or will it mean limitation of growth? The ancient cities were large and prosperous because they were financed from the resources of conquered territory. The modern city is built upon a different basis. If it cannot stand the economic strain, it will fall. Ex-Mayor McClellan of New York, once pointed out that when the tax rate reaches the normal interest rate, the taxes become confiscatory.

In consideration of all sanitary problems the financial element must of necessity control. Relative values must be studied, and then, with fixed appropriations determined by economic considerations, a dollar must be made to buy just as much health and comfort and beauty as possible.

Should Counties Ask Bids from Engineers for Road Work?

Engineers of High Standing Respond Unanimously in the Negative

THE notice reproduced on this page appeared in a local newspaper in the South some time ago. Through the requirement that an engineer must bid for the position of road engineer and furnish a certified check and a bond for the faithful performance of his duty, the engineer is placed in the class of commercial bidders, and no reputable engineer would consider such work. A city or county could secure only second or third rate engineers under these conditions of employment. The method is to be discouraged under all circumstances.

Copies of this notice were forwarded to a number of engineers interested in highway construction and city planning, and summaries of their responses are given below.

A firm of engineers in Philadelphia, acquainted with the situation and conditions in the locality, state that the practice of inviting competitive bids for engineering is unfortunately not uncommon in certain sections, but this particular firm has made it a rule not to enter into any such competitions, as it is felt that the outcome of such methods is usually unsatisfactory to both client and engineer.

A New York consulting engineer states that it would seem as if such a method of securing engineering services would not be successful, for few men who value their standing and future in the profession would

care to seek a commission under such circumstances. A professional man's qualifications and experience should be the guide for the client in selecting his services. The request for a bond for the faithful performance of duty is an insult to the profession.

A well-known Pittsburgh city planner writes as follows: "Local conditions sometimes justify this method in order to protect public interests from the erratic tendencies of low bidders; and, furthermore, the interpretation of certain state laws creates an open question on the expenditure of public funds over a specific sum without competition. Of course, there is usually a rejection clause inserted, but this fact alone does not always guarantee protection. The best protection is to engage the professional services of an engineer who is faithful, capable and honest, with the same confidence and interest that an indi-

vidual has in his physician or attorney, who is never placed on the auction block."

A firm of New York paving engineers states that "this is a very undesirable method for selecting an engineer and is very likely indeed to result in second and third rate engineering supervision. It would be necessary for an engineer to visit the county and determine just what roads and bridges were to be constructed before he could prepare a bid. No provision is made in the

NOTICE TO BIDDERS

Notice is hereby given that the County Commissioners of the County of will receive sealed bids for the engineering upon the roads to be constructed by special road and bridge district number 3, County,, and that such bids will be received up until 10 o'clock Wednesday morning, October 8, 19... It will be the duty of the Engineer employed by the Board to prepare plans and specifications for the work to be done in the said district, and to supervise the work during its progress, and to do all other things usual and necessary for similar cases. *A certified check for five hundred dollars must accompany each bid and the successful bidder will be required to give bond for the faithful performance of his duty in such sum as may be fixed by the County Commissioners.* The Commissioners reserve the right to reject any and all bids and to employ from the bidders the engineer who in their opinion is most responsible and best qualified for the work to be performed. The Commissioners will open such bids as soon after the above time as practical.

(Signed)
Chairman of the Board of County Commissioners.

Attest:
(Signed)
Clerk, Board of County Commissioners.

proposal for any record as to his ability and qualifications, and the deduction to be drawn from it would be that the lowest bidder would probably get the work. Calling for a certified check and a bond for the faithful performance of his duty appears to us to be putting the matter on a commercial rather than on an engineering plane, and if the engineer were incompetent, we fail to see how the bond would protect the county. Personally, we will refuse to bid on work under these conditions, and we believe that the majority of reputable engineers would also decline to have anything to do with it."

A firm of Rochester, N. Y., consulting engineers writes as follows: "Such a proposal hardly deserves comment. Let us hope that it met the fate it deserves, and there can be no question but that it did. No professional man of ability would consider offering himself on such a market. The legal mind that evolved this proposal must have been gathered to the fold under a similar arrangement. For instance, of what value is the certified check for five hundred dollars, except to show that the 'engineer' has that much credit? The commissioners cannot, under their proposal, hold the money, if the 'lucky' man decides to withdraw. We must admit, however, that these commissioners are honest. They throw no camouflage over their real desire, namely, to get the cheapest man at his best figure, while many county and other engineers are selected by such boards for the same reason, although the item 'salary' is only 'among those present' in the advertisement. Times have changed in this respect, however, and engineers are being employed to a much greater extent for their ability, training and experience. The engineer recognizes, and the public is coming to recognize, his true professional standing, and he is not going to barter his talent under any such crude proposal as that mentioned above."

A firm of Pittsburgh engineers of national reputation agree "that this method of securing engineering services is most objectionable and that not only must it necessarily fail to secure the protection which was no doubt the laudable intention of the conscientious public officials who were responsible for it, but, in addition, it is almost certain to lead to the engagement of second and third rate services through awarding the work to the bidder who is willing to cut his price the lowest because of inability to

secure engagements on any other basis. We have had in our experience abundant opportunities to observe the excessive cost to municipalities and counties through lawsuits and through failure or unsatisfactory quality of work, of services secured upon similar bases; and we desire to commend THE AMERICAN CITY for its efforts to induce municipal officials to recognize that the public interest is best served by securing the professional service of reputable and experienced engineers at the usual and reasonable rate of compensation, rather than to attempt to buy engineering as they are accustomed to purchase brick or cast iron pipe."

An Illinois engineer states that it is his "personal opinion that these people will get just exactly what they pay for; in other words, advertising for bids for any professional work, whether engineering or not, is a mistake and cheapens the work all down the line, affecting the contractors and going so far as to bias the attitude of the men. I would as soon think of advertising for bids for this kind of work as I would think of advertising for bids for a dentist or a physician. In every way THE AMERICAN CITY should discourage action of this kind, and if you are successful you will have rendered a service to the community in which the work is to be done as well as to all reputable engineers."

A municipal and industrial engineer says: "I give very little attention to such abortive efforts to secure engineering services. They are so rare and unfruitful in results and this case is so ridiculous that it does not seem to be entitled to much attention. It would be interesting, however, to know just what results were secured and what type of engineers or surveyors responded and who, if anyone, was selected."

A well-known North Carolina engineer says: "This is the second instance that has recently come to my notice of placing engineers on a par with digging ditches and delivering cast iron pipe. I do not believe that an average engineer would care to bid for a job of surveying in County, This is the only instance in which I have seen a certified check required and noticed that the successful bidder would be required to give bond. I suppose that some engineer would bid for this work, but I do not believe that any self-respecting engineer would."

A National Point of View in Education

By George D. Strayer

Chairman of the National Committee on Chamber of Commerce Cooperation with the Public Schools; Professor of Educational Administration, Teachers College, Columbia University

HOW shall we finance education in the United States? Anyone who knows the present situation in education must recognize the fact that we are face to face with a national crisis in education. From an inquiry made by the National Education Association last fall, it was shown that there were 30,000 vacancies among teachers in American schools. Superintendents of schools reported that more than 60,000 teachers entering the schools for the first time this past fall were below the grade of those whose places they took in education and professional training. In the United States only one-fifth of our teachers have had the equivalent of a four-year high school course plus two years of professional training. No other civilized country in the world makes so poor a showing with respect to the qualifications of its teachers.

**Abraham Lincoln said:
"I hope that the time
may come when our
country shall guarantee
to all an unfettered start
and a fair chance in the
race of life."**

Startling Facts

There are still communities in the United States in which children have as little as twelve weeks of school provided for them. There are tens of thousands of children who are in attendance in schools in which the language of instruction is not English, but a foreign tongue. There are tax-supported public schools in the United States in which the teachers are unable to speak English correctly, and in which English, if taught at all, is considered a modern foreign language.

The total number of adult illiterates has been variously estimated. That the number is exceedingly large was established by the examinations given in the army camps which showed one man out of four unable to read an English newspaper and to write an intelligent letter home.

No one will deny the importance of a program of education which will provide for the Americanization of the foreign-born. If those who come to us from for-

eign lands are to contribute most to our civilization, they must be given an opportunity to understand and to appreciate our institutions. It is not merely a matter of teaching them the English language, but quite as much the need for the kind of association with them that will enable us to learn from them as well as to teach them.

That we have neglected the physical well-being of boys and girls was made evident by the physical examinations conducted by the army, which showed one out of every three men unfit for "combat service." We need opportunities for play and physical education in American schools no less than we need better teachers of the subjects now found in our school curricula.

Boys and girls in rural America have not had a square deal. Approximately half of all the public school pupils of the United States are enrolled in rural and village schools. In these schools we have to-day, for the most part, uneducated and untrained teachers. Thirty thousand of these teachers at the present time have no more than a seventh or eighth grade elementary school education. The schoolhouses in which these boys and girls are at work are for the most part without proper equipment in books or apparatus, and in very many cases unsanitary and inadequate in practically every respect. The boys and girls from the farms and from the villages of the United States are coming into our cities. The strength of the city no less than the productivity of our farms is involved in the education provided for these children.

How is the situation to be met? Throughout the United States we have had local and state-wide campaigns for the increase of teachers' salaries, and for money to build school buildings involving increases in state and local taxation for public education. The situation has not yet been met. Teachers

are actually less well paid now than they were in 1914. The increases in salaries have averaged approximately 61 per cent, while the cost of living has increased to a greater extent. Encouragement and aid from the National Government should be provided.

Support the Smith-Towner Bill

The Smith-Towner Bill, which was reported favorably by the Committee on Education of the House of Representatives on Tuesday, January 11, should be supported by all who believe in the future development of our system of public education. The bill provides for the organization of a Department of Education with a Secretary in the President's Cabinet. There are now in Washington more than two score offices, bureaus, divisions, boards, or branches of government concerned with education. An efficient and economic administration of the funds now granted by the National Government in support of education requires that they be organized under a single head. The dignity and practical importance of public education in our national life requires that a representative of education sit in the Cabinet of the President.

The Smith-Towner Bill provides, as well, for appropriations of \$100,000,000 to be distributed to the states for the removal of illiteracy, the Americanization of the foreign-born, the training of teachers, the development of a program of physical education and health service, and the equalization of educational opportunity as between rural and urban areas. This encouragement offered by the National Government is by the provision of the bill to be met by expenditures by the state in every case as large in amount as that received from the National Government. It is provided, as well, that a state, in order to participate in the distribution of funds, must maintain schools for all its children for at least twenty-four weeks in the year; that it must have a compulsory education law requiring attendance between seven and fourteen years of age; and that it shall enact a law requiring that the English language shall be the basic language of instruction in the common school branches in all schools, public and private.

Education: an Investment and an Insurance

There are those who have suggested that

we cannot afford this increased expenditure for public education at this time. The most adequate reply to this type of objection is found in the argument advanced by the British Minister of Education in advocating greatly increased expenditures for education during the period of the war. In answer to his opponents he declared that England could not afford not to spend vastly increased sums of money for education. He pointed out in no uncertain way that money spent for education is to be considered as a productive expenditure. In America to-day we may well ask ourselves whether we may hope to hold our own in the economic world struggle which lies ahead of us if we fail to provide adequate education for all our people. When one considers, as well, the influence of the bolshevistic or anarchistic agitator over the illiterate or foreign-born member of our society who has little or no appreciation of the meaning of our American democracy, he may well reach the conclusion that education is at the same time an investment and an insurance.

Our National Government has encouraged education from the very beginning. With the formation of states out of the Northwestern Territory, land was granted in support of education. As each state has been admitted to the Union since that time, grants of land in support of the public schools of the state have been made in increasing amounts. Since 1863 appropriations have been made for colleges of agriculture and mechanic arts. More recently money has been provided by Congress for the development of vocational education of high school grade. The suggestion that the nation encourage the states, as is provided by the Smith-Towner Bill, is in line with a well-developed policy. Taxes paid to the National Government need not necessarily be increased in order to provide the funds. In the estimates submitted to Congress it is proposed to spend sixteen hundred million dollars for the War and Navy Departments. It may well be argued that one hundred million dollars taken from this amount and expended for education would bring vastly greater returns to the United States. We have less to fear from the enmity of a foreign people than we have from the lack of understanding of our democracy by those who constitute a very considerable percentage of our population.



Courtesy of the Old Colony Magazine

IMMIGRANT CHILDREN JUST LANDED AT ELLIS ISLAND, NEW YORK

Their future usefulness to the community depends largely upon the public schools. The cost of their education represents an investment in American ideals

State and Local Authority Upheld

Arguments against the enactment of the Smith-Towner Bill have been advanced by those who have suggested that the proponents of the bill seek to centralize the control of education in the National Government. Nothing could be farther from the spirit and express provisions of the bill. In Section 14 of the bill, as reported on January 11, are the following provisions: "That courses of study, plans and methods for carrying out the purposes and provisions of this act within a state shall be determined by the state and local educational authorities of said state, and this act shall not be construed to require uniformity of courses of study, plans and methods in the several states in order to secure the benefits herein provided; and provided further, that all the educational facilities encouraged by the provisions of this act and accepted by a state shall be organized, supervised, and administered exclusively by the legally constituted state and local educational authorities of said state,"

If anything further were needed to establish the fact that the centralization of authority or control of education is not contemplated, it can be found in the resolution favoring the passage of the measure adopted by the National Education Association at its annual meeting at Salt Lake City last July. A commission of this association drafted the bill originally and has supported it vigorously during the past eighteen months. The resolution reads as follows:

"We urge the immediate passage of the Smith-Towner Bill by which federal participation in the support of public education is provided and which, at the same time, preserves the autonomy of the state in the management of its schools. We condemn the efforts of the enemies of the public schools to defeat this measure, particularly by stigmatizing it as a measure which involves national control of education. Such control is not only clearly unconstitutional, but it is out of harmony with the spirit of American institutions. This Association pledges itself unreservedly to oppose any

movement or proposal that would centralize control of the public schools."

Wide Endorsement of the Bill

The Smith-Towner Bill has the warmest support of those responsible for the administration of public education in the United States. Every state superintendent of schools, with possibly a single exception, has approved the measure and is working for its passage. The state, city, and county superintendents of schools in their last annual meeting, with more than four thousand men present, unanimously endorsed the measure. It is even more significant that laymen's organizations have debated the question and have endorsed the measure and are working for its passage. Among those that have given their unqualified support are: American Federation of Labor, American Federation of Teachers, General Federation of Women's Clubs, National Congress of Mothers and Parent-Teacher Associations, American Library Association, National Council of Jewish Women, Association of Collegiate Alumnae, Patriotic Order Sons of America, National League of Women Voters, and National Society Daughters of the American Revolution.

America must wake up if she is to hold her place among the great peoples of the world. A failure to provide education for all the boys and girls of America is to invite disaster. The most direct and effective channel through which the forces of social control can operate is the public school. Ignorance cannot be segregated. The failure to provide education in one part of the country is a weakness that affects the whole country. If we are to make good the promise of democracy in terms of an equalization of educational opportunity, the nation must encourage and aid its schools. May we not look forward to the realization of the ideal of our democracy as expressed by Abraham Lincoln when he said:

"I hope the time may come when our country shall guarantee to all an unfettered start and a fair chance in the race of life."

Combined Open Air Swimming Pool and Hockey Rink at Milton, Mass.

By Robert Spurr Weston

Weston & Sampson, Consulting Engineers, Boston, Mass.

EVERY boy, every girl for that matter, needs a "swimmin'-hole" or its equivalent. Fortunate indeed is the youngster who has access to one, or to clean and copious streams, or to pond, bay or ocean. Not all are so situated. Frequently

"The bridge of the railroad now crosses the spot Where the old divin'-log lays sunk and fergot."

Often where there are the most who desire to bathe, the streams are small or polluted, or the waters are unsafe. For such, artificial pools and ponds are being provided in increasing number. These pools have been very popular, and usually the number of users has been underestimated by their designers.

Such a pool has recently been completed in Cunningham Park, Milton, Mass., one of the southerly suburbs of Boston. This pool is so arranged that it may be converted into a hockey rink in winter, thus greatly extending its yearly period of service.

The Source and the Site

The source of supply for the pool is a small, clean brook which rises in the nearby Blue Hills of the State Reservation. In summer the discharge of this brook is frequently less than 100 gallons per minute. For that reason and others, the contents of the pool are circulated continuously through a filter, a method commonly used for keeping indoor tanks in proper condition.

The site is a low-lying meadow, which was formerly flooded in winter. The soil consists of wet, slippery clay and many boulders, and, while water-tight, obviously increased the difficulties of construction. Around the meadow in which the pool is located, on the bordering hillocks, are fine old evergreens and second-growth hard-



THE SWIMMING POOL, MILTON, MASS., SHOWING HOW IT HAS BEEN DESIGNED TO FIT THE CONTOUR OF THE GROUND

wood trees of good size, which have been supplemented recently by plantings of white pine and hemlock, designed to give the pool a natural setting as shown in the illustration above.

Design of the Pool

The pool is irregular in shape. The shore lines are curved. The outlines of the pool are clearly shown in the photograph. Its greatest length is about 315 feet, and its average width about 150 feet. Its greatest depth is 8 feet, and there is a sand beach with shallow water for wading, around the whole pool. This beach slopes towards the concrete lining of the deeper section. This lining covers an area of 180 by 80 feet, which are the dimensions of the hockey rink. Around its border are sockets which support stanchions. These project 4 feet, above the water, and are of 2-inch pipe, spaced 8 feet center to center. They support the 16 by 4-inch sections of the wooden barrier which is placed about the hockey rink in winter.

The pool and rink are well lighted from overhead by four 750-watt Mazda lamps, and are used in the evenings, both in winter and summer, thus giving pleasure to many who otherwise could not enjoy them.

The pool is provided with a chute and a diving float. The chute is located at the east

end, in shoal water, and is used by small children and other non-swimmers. The diving float consists of a platform 13 by 18 feet, supported upon twenty 50-gallon oil barrels. On one side of the float is a spring-board of the usual type. On the opposite side is a spring-board with a low platform above it, arranged so that bathers may jump from the platform to the spring-board. Between the spring-boards is a diving-stand with a platform 4 feet wide by 5 feet 6 inches long, elevated 7 feet above the surface of the float.

The Filter

The sand filter, which is of the slow or English type, is 18 by 30 feet in area, and is located in the south bank of the pool. It is built of concrete, with roof of reinforced concrete, the latter covered with earth over which vines have been planted so as not to detract from the natural appearance of the pool. The filter contains 3 feet of sand supported on graded gravel and underdrained in the usual way, with tiles. Adjoining the filter is a small house, 10 feet square, which contains the devices for regulating the filter, and a 1½-inch motor-driven centrifugal pumping unit which circulates the water of the pool through the filter and also empties the lower section of the pool, which is too low to be drained by gravity. The walls of the filter house have a stucco finish, and its roof is covered with "color-blend" asbestos shingles.

The waters of the brook are diverted to the pool by means of a low dam, and flow through a 6-inch pipe-line, which discharges into either the filter or the pool, as desired. During most of the year the brook water is so clear that its filtration is not necessary, but if it is not clear, the pool can be filled through the filter. The pool holds about 750,000 gallons of water, and the filter is designed to circulate its contents weekly.

The Pool is Popular

The hockey rink was used during the winter of 1919-20, but the pool was not used until the last of July, 1920. The pool came into favor instantly, and although the summer was below the average in coolness, it was used beyond all expectation. The Trustees estimated that as many as 250 persons a day might use the pool, but on the last Saturday in August, five hundred,

mostly boys and girls, availed themselves of the privilege. Over 8,000 bathers used the pool during the protracted hot wave in August, 1920.

Cunningham Park is a large estate held in trust for the benefit of the citizens of Milton. The property, over 200 acres in area, consists largely of forest and meadow, with some arable land. Within the park, the Trustees have established a convalescent home, and a gymnasium with bowling alleys, tennis courts, etc., and have flooded the meadow for skating during the winter. None of these means of amusement, however, have been so popular with the residents of Milton as is the new swimming pool. This experience is similar to that of other places where open-air pools have been constructed. Nothing costing so little seems to please so many people so much.

Keeping the Pool Sanitary

The sanitation of the pool has been a matter of deep concern. Bathers were permitted to use the pool before any bath-house could be built. The boys and girls came in their bathing-suits, or changed into them in the near-by gymnasium. It was impossible to insist upon baths before they entered the pool. Bacteriological samples have been collected weekly, and the findings are good, considering the promiscuous use of the pool. The numbers averaged 672 per c. c., which is considered quite remarkable in view of the fact that the brook water sometimes contains 500 bacteria per c. c., although the average is less than 400 per c. c. This is a fair bacteriological condition, and is due to the disinfecting action of light and other agencies of self-purification, and to the low bathing load due in turn to the large size of the pool. It is considered very important to operate the pool under bacteriological control.

Because its construction was in wet clay and boulders, the cost was abnormally high, even for the present times. With filter, dam and connecting piping, it was about \$40,000. In most places this cost could be reduced materially even with prevailing prices for materials and labor.

The plant was designed by Weston & Sampson, consulting engineers, with the advice of Loring Underwood, landscape architect, all of Boston.

The Municipal Forest in Fitchburg, Mass.

By G. A. Hubbard

City Forester, Fitchburg, Mass.

FITCHBURG, a city of hills, in Worcester County, Mass.,⁴ located fifty miles from Boston, with a valley running from the Leominster line through the heart of the city to the Westminster line for a length of four or five miles, lined with manufacturing plants whose products go all over the world, was the first city in America to establish a municipal forest. On December 29, 1914, during the administration of Hon. B. A. Cook as mayor, a petition was introduced by Dr. D. S. Woodworth, Chairman of the Park Commission, as follows:

Ordinance for placing under control of the City Forester certain tracts of land belonging to the city.

Ordered: that the tracts of land herein mentioned and belonging to the city, be and hereby are placed under the supervision, control and management of the City Forester as a part of the public domain, to be devoted to the culture of forest trees and, incidentally in some measure, to the preservation of the water-supply of the city:

First, a tract of land of approximately 50 acres, located on Turnpike Road (so-called) and known as the Wanoosnoc Lot.

Second, a tract of land of approximately 31.24 acres, located on Rindge Road and known as the Taylor Farm.

Third, two tracts of land of approximately

16 and 8 acres, respectively, and located on the Ashby Road, and known as the Raymond Lot.

The order was adopted in concurrence, presented to the Mayor and approved by him December 29, 1914.

Description of Tracts

The land forming the forest is composed of four lots with a total of 109 acres and situated in different parts of the city. The upper Raymond tract consists of 10 acres on the boundary line of Fitchburg and Ashby. This 10 acres is covered with hard wood of about 25 years' growth, and is in good growing condition. A little west of this tract is the lower Raymond Lot, which consists of 21 acres. More than half of this area is well covered with white pine of about thirty years' growth, the remainder of the lot being in hardwood, and a small portion of pasture covered with juniper. A small part has been cleared preparatory to planting with pine.

A little nearer the city is situated the Taylor Lot of 31 acres. About 19 acres of this lot is covered with pine of probably 40 years' growth. The remainder, aside from a small portion that naturally seeded, has been planted with white and Scotch pine. A



SMALL PINES WITH FIRE HAZARD OF DRY GRASS



A STAND OF WHITE PINE—BETWEEN 30 AND 40 YEARS' GROWTH

portion of this planting has been in for five years, and the rest of the lot has been planted three years. The planting and the condition of this lot make a good object lesson, and show conclusively that planting pine where natural seeding does not do the work is a practical undertaking. After the young stock becomes established,—which usually takes the first year,—rapid progress is made. During the third year the growth is frequently from 1 to 1½ feet, and after five years individual trees have been noticed with a new growth of fully 3 feet.

The Wanoosnoc Lot is situated on Wanoosnoc Hill in the southern part of the city adjoining the Leominster line, and has an area of 47 acres. About 15 acres is covered with hardwood growth and chestnut about post size. A portion of the chestnut has been cut and the remainder must soon be cut, as the chestnut blight is making headway and nearly all the trees are affected. This disease is reducing the chestnut stands in Massachusetts very rapidly, and within a few years it will be impossible to find chestnut timber for poles, posts, plank, and many other important needs which this valuable tree has filled. The good old days of chestnutting, which was often a source of revenue as well as pleasure, will be a thing of the past, remembered only by the older people, who will tell the younger generation about picking up chestnuts by the bushel when they were young. It is hoped to find a method of fighting the blight.

Success of the Project

Forestry firms doing planting by contract usually guarantee from 70 to 80 per cent of planted stock to live, but in the experience of Fitchburg a much larger percentage is made to survive. The planting done during the last three years shows over 90 per cent alive to-day. Of course sufficient rainfall during the first month or two is essential. Assuming that the trees are properly planted and there is reasonable precipitation, the per cent should show well above 90. The earlier the planting can be done after the ground opens, the better.

Waste land is a liability and usually entirely non-producing. This liability can be changed to an asset by adopting reasonable and inexpensive methods which are beyond the experimental stage and have been demonstrated as practical, good business. Many states are to-day buying up and reforesting waste land, a plan which is being followed by many progressive individuals and which should be adopted by municipalities.

Many cities and towns already own land used as watersheds or otherwise which could be planted. The main thing is to plant, whether it be done officially through a municipal forest or not. Every tree warden, every park board, every water board, and every individual who has land suitable for this purpose should do a little each year. The surroundings of reservoirs and sources of supply must be wooded to a certain extent.

These many acres can be planted, and as they reach harvesting age, can be thinned and replaced, making a source of revenue, as well as helping to conserve moisture and to improve appearance.

The Necessity of Fire Lines

Fire lines must be maintained in planting, for the fire menace is greater when the trees are small than later on. Fire not only destroys the young trees but also reduces the humus cover, which is fertilizer and retains moisture. Especially is this true for old pasture land. During the first five years, until the stand is capable of making shade, all sorts of weeds and grasses make a fire hazard which should be guarded against by fire-breaks; then, should fire start it could be handled without sacrificing the whole. Forest fires cause a loss of over twenty million dollars a year.

A fire line cleared of brush from 10 to 20 feet wide around or through a lot will insure protection from approaching fire by giving a position from which to fight. Fire notices should be posted in conspicuous places each year, and, replaced if removed.

In the larger areas of newly planted stock the fire-break is of great importance, for the grasses form a fire hazard which is nearly always like tinder, drying in a few hours after rain, and as fire creates its own wind, sometimes traveling at race-horse speed. In the view on page 122 is shown a lot entirely of white pine of from 30 to 40 years' growth. The shade causes moisture to be retained, and the fire-lines need be only around the outside as protection from adjacent lots. Cases of fire loss in pine of this size are rare, for any serious damage would be caused by crown fires, which would come from the outside and be very intense.

The Value of Reforested Land

The present high prices of lumber are a great temptation for a man who has waited a long time for his pine lot to mature, and many are putting pine into money too soon. The writer has seen large quantities cut when to have left it a few years would have been the better investment. Owners of pine lots need have no fear of a slackening demand or a diminishing price, for waste in handling due to the old idea that timber resources are inexhaustible is gone, and reason and common sense are urgently calling to intelligent people's attention the duty of

reforesting. This must be emphasized generally, not only to state and city forestry departments, but to individuals. Those acres which are not working should be made to pay. The initial expense is small, and after a few years comes the steady increase in value.

In the spring of 1919 the Forestry Department of Fitchburg planted for an ex-mayor of the city an area taking 125,000 pines. This man is 65 years old, and there is no thought of his cutting these trees at maturity. He is planting for the future, and his pleasure in watching the trees grow is a sure reward.

Land suitable for this purpose can usually be obtained at very low cost, probably around \$5 per acre. Planted 6 by 6, it costs about \$12.50 per acre for the transplants, and with \$8 for the cost of planting, the total cost is \$25.50 per acre. In some states land so improved is exempt from taxes for a period of years. This is not all the probable expense until maturity. In large areas a few replacements may be necessary, but usually, provided 90 per cent live, the few trees that die are so scattered they are not replaced.

City Forests Invaluable

In state or individual planting white pine is generally used, being of more monetary value than any other. In city forests, from an educational standpoint, a few Scotch and Norway pine may well be planted. In our locality, where the gypsy moth is at home, it is not advisable to have pine and hardwood together. The hardwood should be removed, leaving the pine, and thus making it immune from moth pests. In lots of hardwood growth, white ash is recommended for planting, as it is practically moth-proof.

The results visible in the Fitchburg municipal forest at this writing show conclusively that tracts of land not suitable for crop culture can be utilized and made to produce valuable products. The value of this work for a community or an individual is of far-reaching consequence, and demonstrated success is an incentive for increased efforts.

Of course in the forming of a municipal forest from four-year-old transplants a considerable period of time must elapse before the stand shows that it is a practical business proposition. Rather than having to begin from the ground up, it is advisable to purchase land at a higher cost than that of

waste land—for example, a lot partially covered with young growth, giving opportunity for planting. Private owners or state plantings can use with success the waste land; but with a city, if the land is to serve a recreative and instructive purpose, a partly grown portion is to be preferred.

The acquisition and maintenance of a municipal forest ought to be an easy matter for any city or town. Some man who is alive to the benefits must move, and the beginning requires a hard push, but after the first lot is obtained and a start made, the positive

results soon and easily obtained will warrant enlarged operations. In many places there are people public-spirited enough to give for this purpose land that is not suitable for crop cultivation. Trees and rocks are the best of friends.

The last session of the Massachusetts Legislature passed a bill providing for the purchase and planting of 100,000 acres of land. Many lumbermen appeared in support of the measure, which is ample proof of the need of insuring our future lumber supply.

Traveling Forestry Exhibits for Public Libraries in New York State

New York State College of Forestry at Syracuse Spreads Educational Material Throughout State

THIRTY-SIX libraries in New York State through coöperation with the State College of Forestry will have an opportunity to demonstrate to their patrons the different phases of forestry and what forestry is doing in the state to help develop idle lands. This demonstration is made by traveling "pocket exhibits" which are sent to the various libraries by the College of Forestry. The exhibit consists of eighteen panels divided into sets of six panels each. Each set is in a town or city for two weeks and is then sent on to the next town on the circuit and the second set installed for a second fortnight.

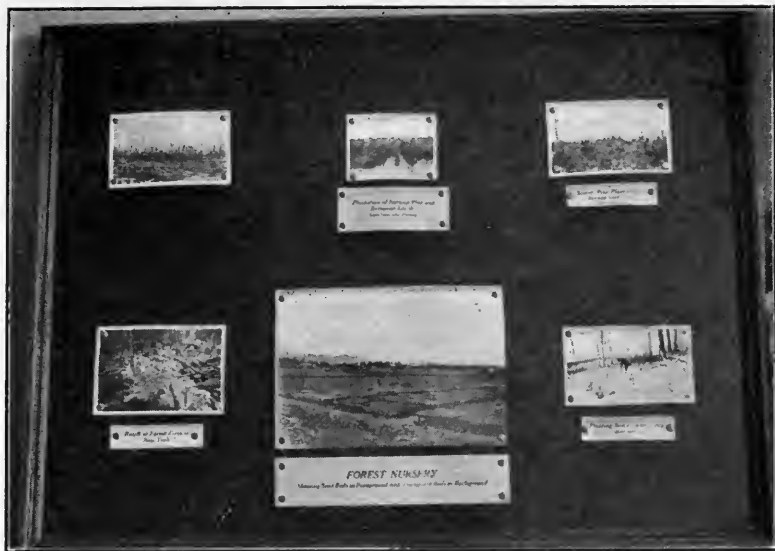
The Nature of the Exhibits

How the ambrosia beetle destroys trees by growing its own feed in a form of fungus which discolors and impairs the value of the timber, is graphically shown by Set No. 1. The work of this beetle which, like that of the elm leaf beetle, threatens destruction to the beautiful shade trees of New York State, is illustrated in pictures and samples of the affected trees. The ambrosia beetle grows within the holes it makes in the wood, and damages lumber by running individual food gardens. The work done by fungus is also shown, with the story of the blister rust, which has worked havoc among the white pines of America and whose ravages have caused a nation-wide campaign to eradicate the pest.

The reforestation panel included in Set No. 1 shows what happens when cut-over lands are allowed to be burned and the erosion which follows makes what was once a productive forest a waste of barren rock. The panels are designed to show that New York should add to its forest wealth by making its forest lands grow crops of trees.

Set No. 2 shows how the waste of the forest can be converted into clothes-line and other such substances. Here is shown the progress of the tree from the forest to the clothes-line. First, it is converted into pulp by grinding, and is cooked and treated in the paper mill until it is ready for the next step in the process of manufacture. It is converted from pulp into kraft paper, a tough type of paper, which is then twisted and treated until the ground wood paste has been turned into clothes-line that will not soften or weaken when the Monday wash is hung upon it. Another feature of the exhibit is the silk made from what was also the waste of the forest. To-day artificial silk stockings are being made from sawdust, by chemical conversion of the wood into cellulose, and its weaving into fabric. There were 15,000,000 pairs of artificial silk stockings made from wood in America last year.

This set includes a panel which is of particular interest to those who are thinking of taking up forestry as their life work, as it shows typical episodes of student life. Pictures show the students not only in college,



SAMPLE PANEL OF THE TRAVELING EXHIBITS

lowest possible cost, for two weeks each. It costs only about \$9 a week per person, and for this amount each family is provided with its food from the camp kitchen, its own cottage, and even the railroad fare of about 75 miles to and from Los Angeles.

How the city forester works to give a city the proper types of shade trees and to keep the

but also in summer camp at Cranberry Lake and at the State Ranger School at Wana-kena.

The story of forest recreation and city forestry is graphically told by art photographs in the third and last set of the pocket exhibits. One panel, for instance, shows the municipal forest of Los Angeles, which has a public camping ground in the Angeles National Forest, known as Camp Seeley, where whole families are allowed to go at the

streets and parks beautiful from the standpoint of the forester, is also shown, as well as the development of school and home grounds. Various pictures of the Adirondack forest, an Adirondack lean-to and a state camp fire are also displayed in this set.

The exhibits are furnished by the College of Forestry, and the libraries pay the express charges between the cities on the circuit, thus carrying the gospel of forestry to many thousands of people.

Highway Departments Store Road Material in Winter

Attention has been called in the editorial pages of THE AMERICAN CITY to the need for shipping and storing road-building material during the winter and early spring, in order to expedite construction work in the short open season, particularly in the Northern States. We beg to call attention to some instances where governmental units have taken advantage of this method of expediting road construction.

Ogden, Utah, shipped in sufficient material for 20 miles of roadway last winter, and this road was completed in record time during the 1920 construction season. The state of Delaware has followed this practice for three years. The Board of Freeholders of Passaic County, New Jersey, has acquired a central storage yard for stock piling road materials this winter. An Illinois city, Belleville, has already stored

cement for next season's work.

A number of states, recognizing the advantage of the early transportation and storage of material, have made it possible to pay the contractor in full or in part for the material when it is delivered. It can now be done in the following states: Alabama, Arkansas, California, Colorado, Connecticut, Georgia, Delaware, Idaho, Illinois, Iowa, Kansas, Maine, Maryland, Minnesota, Michigan, Nebraska, New Hampshire, New York, Rhode Island, South Dakota, Tennessee, Virginia, West Virginia, Wisconsin, Wyoming, District of Columbia, Oregon and Vermont. In ten other states such procedure is not possible at the present time under existing statutes. In only three states is there any sentiment against this procedure.

"House-Cleaning" for Water-Mains

Flushing of Mains in Terre Haute Worthy of Note by Municipalities

NO matter how good the water-supply, nor how clear and sparkling the water sent into the service mains of a city, there is bound to be some accumulation of sediment, just as there is some dust always to be found in the home that is swept and dusted daily. In order to remove this sediment and to keep the mains in good condition, the Terre Haute Water Works Company, Terre Haute, Ind., flushes out the mains two or three times a year. Extra help is secured, and the hydrants nearest the station are opened up so that there are six 2½-inch streams discharged at one time with two nozzles to a hydrant. As soon as the water from the hydrant nearest the station is running clear, and while it is being closed, the man at the fourth hydrant is just opening that up and the man from hydrant number one goes to number five. In this way the discolored water is confined to a limited area. Freshly filtered water follows up the flushing, flowing through the pipes that have been cleaned.

When the hydrants in the business district are being flushed, the gang goes out about 4:30 in the morning, so that the work can be done before heavy traffic appears.

In order to do effective cleaning, it is necessary to materially increase the velocity or rate of flow in the mains. Hence, three hydrants are opened at one time. In order to get the greatest benefit from the flow, the water is permitted to run out onto the street instead of running through a hose to the nearest catch-basin, because the friction of the hose would reduce the rate of flow.

We Are Cleaning House

Twice a year, we flush our street mains, which is similar to Cleaning House, thus following the example set by all good housekeepers.

Cleaning house is expensive and not the most agreeable task in the world, but we believe the good people of Terre Haute are entitled to the best possible service.

If the water does not become clear in a little while, kindly advise us.

**THE TERRE HAUTE WATER
WORKS COMPANY
TELEPHONE-215**

THE NEWSPAPER ANNOUNCEMENT OF THE "HOUSE-CLEANING"

In Terre Haute it usually takes about 6,000,000 gallons to flush the hydrants, and the extra labor amounts to several hundred dollars, in addition to the value of the water used for flushing. This work virtually amounts also to a testing of the hydrants, so that it is insured that they are in good condition for use by the fire department. On one occasion two hydrants were found broken below the ground. They had evidently been hit by automobiles or trucks, and no notification had been sent to headquarters.

It would be well for more municipalities to seriously consider this proposition of regular flushing of the service mains, in order that there may be fewer complaints by consumers after fires. If sediment is regularly removed through flushing, there is no opportunity for such complaints.

Maintenance Cheaper Than New Roads

By Philip P. Sharples

THE 1920 road program throughout most of the United States was a program reduced at every point until in reality it amounted to little beyond an attempt to finish work begun during the previous year. Road officials were forced to see what could be done with the roads they already had, or, in case construction was absolutely necessary, were obliged to turn from more expensive types of road surfacing to the contemplation of cheaper means of providing a road suitable for modern traffic.

The money that can be saved by revamping an old road, rather than reconstructing it, may best be stated in figures: to rebuild a road of standard 18-foot width with any of the modern first-class pavements costs in the neighborhood of \$40,000 for the top alone, irrespective of the grading and drainage. The interest on this money at the present time, even at 5 per cent, amounts to \$2,000 per year. We must also provide for replacing the road when it is worn out.

Giving the road the extraordinary long life of 20 years would call for \$2,000 a year to be set aside for replacement. In addition to this, every road requires maintenance and up-keep, and this can hardly amount to less than \$500 per mile per year through any period of years. We thus have as a total of our yearly expenditures, in case we build a new top, \$4,500 per mile per year. In other words, if in any way we can so take care of the road that is already in use as to make it acceptable to the traveling public for anything less than \$4,500, we have saved the city, county or state money. This is an aspect of road building that has not been popular with road engineers. It has been more fun to design and construct new roads than to devise means for caring for our old roads and then carrying out the work economically and acceptably.

Pennsylvania's Road Thrift

The state of Pennsylvania has realized for some time the merits of taking care of



WHITEHALL ROAD, MUSKEGON COUNTY, MICHIGAN

This photograph shows the contrast between an untreated gravel road and one which has received annual treatments with Tarvia "B" and coverings of limestone chips since 1915

the roads they have. If this had not been so, it would not now be possible to travel over the Lincoln Highway from one end of Pennsylvania to the other with comparatively little discomfort. It is true that the old road breaks up in places in the spring, but these are put in shape again and the road receives maintenance by patching with some of the new road-patching compounds, and by surface treatments of bituminous materials. These simple means for caring for the state's macadam roads are sufficient to keep them going except where the traffic becomes extremely dense and heavy. Even here the state has found means of resurfacing the old macadam roads at a comparatively light expense so that they may again carry the traffic of trucks and automobiles over a smooth and easy-riding surface. The writer refers particularly to the work that has been done on the Lancaster Pike going out of Philadelphia.

Other states have devised other methods of handling the same problem; for example, the work on the old National Pike in Maryland, carried along year by year in a very acceptable way with bituminous surface treatments. The state of Massachusetts, the oldest in a constructive highway policy, has improved year by year its original highways by very simple methods of resurfacing. The penetration method has given excellent results, and even the heavy motor truck traffic in the vicinity of Boston is largely carried on this type of road. Similar methods to that used on the Lancaster Pike have also been used in Massachusetts with success.

The problem is the same in cities and

towns. Philadelphia, for example, has a large mileage of old macadam streets that it can ill afford at the present high prices to throw away. William H. Connell, former Chief of the Bureau of Highways, showed what could be done in the residential district on this type of road by smoothing up and rebuilding many miles and then surface-treating them with tar materials. The work started by him is still carried on by the city.

Pennsylvania state highways traverse many incorporated boroughs. Some of these evince the pride of ownership and have put the streets traversed by the state highway in good condition; others have lost their sense of pride, or else abide their time, thinking that if the road is bad enough the state will step in and help them. These borough thoroughfares are a neglected part of the state's programs for good roads. Some of the well-known cheaper methods of road building would be applicable to these now abandoned thoroughfares. The main street of Leroy, N. Y., a splendid, wide thoroughfare between the stores, traversed by the East West Mohawk Valley Trunk Line, was in deplorable condition last year, and it was thought it would be necessary to appropriate a large sum of money to rebuild it. The town engineer, however, seeing that the appropriation would not be possible for the town's finances, begged to be allowed to try a simple experiment in rescarifying, reshaping and treating with a cold tar application. The result was a splendid success, and the street is carrying a heavy traffic and is a pleasure to the town's inhabitants.

The Looks of the Town

By L. S. Cole

Most of our cities depend primarily on geographical or geological location for their prosperity, yet some of those most fortunate in these respects often fail to attract desirable industries, and even frequently fail to hold those already located within their borders. In many cities "booster" clubs tell of the wonders and glories to be found therein, and when we approach these cities, we are greeted with the most uninviting, tumble-down assortment of buildings imaginable. Our railroad depots are sometimes located in the worst parts of town. How can we expect the town seeker to be other than disappointed? How else is he to

measure the community service we have to offer? Surely the town that is made pleasant to live in from the standpoint of merchant, workman, and property owner alike is assured of peace and plenty. And just as surely, the town that fails, through lack of foresight or planning to provide the proper civic service will pay the penalty due to the stultified growth and decadence which must surely overtake its industries.

ACKNOWLEDGMENT.—From an address delivered before the annual convention of the Indiana Real Estate Association, Muncie, Ind.

Remodeling and Enlarging the Water and Light Plant at Perry, Oklahoma

By W. C. Harmon, Jr.

EXTENSIVE improvements to the water and light plant have just been completed by the city of Perry, Okla. These include a concrete dam, a flow line of 12-inch cast iron pipe, a low-service pump pit, and motor-driven centrifugal pumps, reconstructed settling-basins, new rapid sand filter plant of 1,000,000 gallons per day capacity, new motor-driven turbine pump for high service, Diesel oil engines and generators to replace the present steam power plant equipment, and necessary changes to buildings.

The water-supply had previously been secured from two impounding reservoirs, one of about 20,000,000 gallons capacity located on the west side of the town, the other in the hills southeast of the town, having a capacity determined by its drainage area of about one square mile. Both of these are connected to the new plant. The low-service

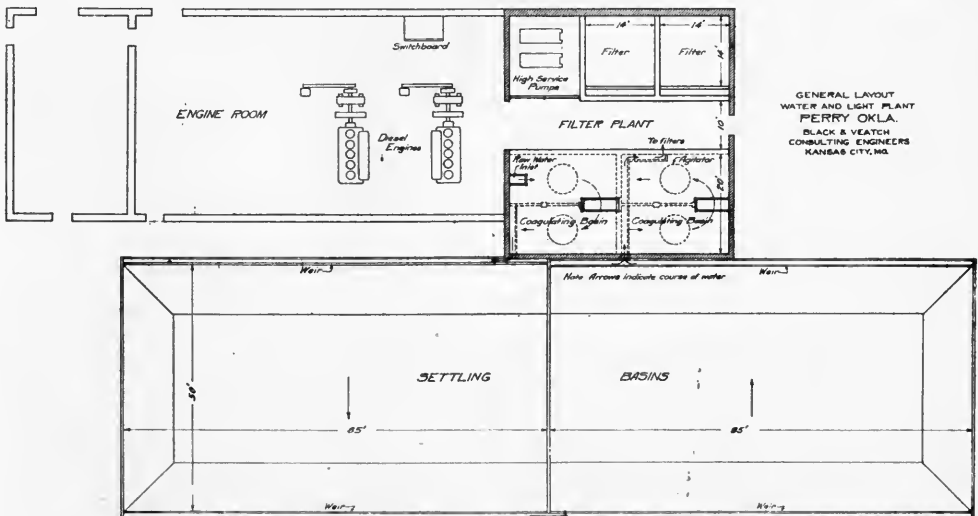


INTERIOR VIEW OF PERRY, OKLA., FILTER PLANT

pumps can draw from the pipe line from the west reservoir, while the reservoir in the hills is high enough to discharge directly into the filter plant.

The Dam and the Reservoir

To secure the needed additional water-supply, a new impounding concrete dam was built in Cow Creek, just above the water plant. The dam is built of mass concrete,





ONE OF THE DUPLICATE SETS OF 180-HORSE-POWER DIESEL ENGINES

290 feet long, 21 feet high above low water, and 23 feet above the rock on which it is founded. There are reinforced concrete wing-walls at each end of the dam, having a total length of 63 feet on one end and 73 feet on the other. The dam is designed to pass a flood 3 feet deep over its crest. A notch in the crest at the location of the stream channel, 6 inches deep and 30 feet long, gives an opening for the ordinary flow of the stream.

The new reservoir thus formed has a drainage area of 30 square miles, a water area of 30 acres, and an average depth of 9.5 feet, with a total storage of over 100,000,000 gallons and an available storage of 83,000,000 gallons. A dam and reservoir of the Santa Fé Railway will be submerged by the new lake, and in figuring the available storage a maximum allowance is made for water used by the Railway Company. This reservoir, with the two present reservoirs, will give the city sufficient storage capacity to supply 500,000 gallons per day over the longest known dry period.

There was no record of the consumption of water available at the time the designs were made, but it has probably been less than 200,000 gallons per day. The population was estimated at about 4,000, so that the 500,000 gallons per day from the plant will be sufficient for some time to come.

An intake manhole is built in the dam, in which are three sluice-gates at different elevations so that the best water may always be used. Each sluice gate is protected by a screen of bar iron with 2-inch clear open-

ing. From the intake manhole a 12-inch cast iron pipe leads to the low-service pump pit.

The pit for the low-service pumps is built of reinforced concrete, 12 feet square and 24 feet deep. This is low enough so that water reaches the pumps by gravity most of the time. There are two 400-gallon-per-minute, centrifugal pumps, horizontal, direct-connected to three-phase, 220-volt induction motors. The water is discharged into the first mixing basin of the new plant from these pumps.

The old settling basins were revised and used in the new layout. The two basins were each 50 feet by 85 feet on top, total depth 10 feet, and concrete-lined with sloping sides. They were separated by a thin buttressed partition wall. The capacity of the basins was increased by building a wall on top of the outside curb, increasing the depth to 13 feet 6 inches, with a water depth of approximately 12 feet. This was required so that the filters could be located at a desirable elevation, to furnish an anchorage for the weirs and to lengthen the period of sedimentation. Inlet and outlet weirs were built in each basin so as to make the flow uniform, and the partition wall was raised to the same height as the outside walls. The water now passes through one basin and then through the other. The revised basins have a capacity of 650,000 gallons, which gives a settling period of 15½ hours, when the plant is operated at a rate of 1,000,000 gallons per day. The average speed of horizontal travel is 1/10-foot per minute for the 1,000,000-gallon rate.

The Filter Plant

The new filter plant is built at the end of the power plant and adjoins the settling basins. It includes two coagulating basins, two filter units, and a clear well, and is built of reinforced concrete surmounted by a building of stone masonry and stucco on metal lath.

The two coagulating basins each have a period of flow of approximately 50 minutes at the rate of 1,000,000 gallons per day.

They are equipped with mechanical agitators for mixing in the coagulating chemicals, consisting of two steel paddles in each basin, all driven by a water motor. The water enters one basin from the low-service pumps, and may be dosed with either lime or sulphate of alumina. After passing through the coagulating basin, the water goes through the settling basins and enters the other coagulating basin. It is there dosed with sulphate of aluminum, and after mixing flows to the filters.

There are two filter units of reinforced concrete, each 14 feet by 14 feet in plan. Operating at a normal rate of 2 gallons per minute per square foot, the two filters have a total rate of approximately 1,125,000 gallons per day. Since the estimated maximum average consumption is less than half of this, 500,000 gallons per day, it may be supplied by about 11 hours' run of the filter plant. This capacity allows for the supplying of extraordinary demands and for operation with one unit out of service.

The filters are of standard construction, with a 30-inch bed of filter sand supported by an 18-inch bed of graded gravel. The underdrains consist of a cast iron manifold tapped for wrought pipe laterals, 6 inches center to center. The lateral pipes are placed above the concrete floor, and have 3/16-inch holes on the bottom, 4½ inches apart, with alternate holes staggered from side to side, having an angle of 90 degrees between them. Bronze bushings are tapped into the lateral pipes for these openings. Venturi-type effluent controllers are used, with a float controller butterfly valve to stop the filter when the clear well is full. Float-type loss-of-head gauges are used.

High velocity wash, without air, is used. There are three cast iron gutters in each filter unit, designed to handle a washing rate of 16 gallons per square foot per minute. The wash water is stored in a cypress tank on the second floor of the plant, which has a capacity of 17,500 gallons.

The greater part of the building is two stories high, and reinforced concrete was used for the floor construction. The second floor is used for chemical storage, and contains the wash-water tank and chemical solution tanks. There are two cypress solution tanks for aluminum sulphate, discharging into either of two orifice boxes. One orifice box may be used to dose the raw water as it enters the first coagulating basin,

and the other one may dose the settled water as it enters the second coagulating basin. A dry lime feeding machine on the first floor is fed from a hopper on the chemical floor, and in turn feeds the chemical into the first basin. It is electrically driven.

The high-service pumping equipment is completely revised for electrical operation. The city had on hand a 500-gallon-per-minute turbine pump, motor-driven, designed to pump against a head of 231 feet. This is to be used as a fire pump. A new 400-gallon-per-minute motor-driven turbine pump, operating against 200-foot head, was purchased for use as a service pump. Both pumps were installed on the pipe gallery floor of the new plant and draw from the clear well below. The water is sterilized by the application of chlorine into the pump suction.

The work also includes the rebuilding of the electric light plant. The old single-phase steam-driven generators were replaced by new oil-engine-driven units. These are 180-b.h.p. Diesel engines driving 150-kv.-amp., 2,300-volt, 60-cycle alternators. A new switchboard and new station wiring were required.

For One-Man Operation

It should be noted that the water and light plant is designed for one-man operation. The operator standing at one end of the filter operating floor will have in view the raw water as it enters the plant, the coagulating basins, the filters, the high-service pumps on the floor below, and the oil engines, alternators and switchboard in the engine room. The starters for both the high-service and low-service pumps will be within reach. The only part of the plant not visible from the one position is the low-service pumps in their pit 150 feet away.

The plant was designed and construction was supervised by Black & Veatch, consulting engineers, Kansas City, Mo. C. G. Bayles was resident engineer on the job. The dam, filter plant, and pipe lines were built by Alderson and Knox, of Perry. The filter equipment, filter piping, wash-water tank, and chemical equipment were furnished and installed by the Roberts Filter Company, of Darby, Pa. The Diesel engines were furnished and installed by the Busch Sulzer Bros.-Diesel Engine Company, and the pumps by the F. M. Beeson Machinery Company, of Kansas City.

Unusual Service of a Storm Drain

How a Corrugated Iron Drain Carried Dèbris and Heavy Boulders in Pomona, Calif.

By Carence E. Bayley

City Engineer of Pomona, California

ONE of the municipal improvements of which the city of Pomona, Calif., feels proud is the 4-foot corrugated storm drain which was installed in 1915. This drain consisted of 581 feet of 14-gauge Armco ingot iron corrugated pipe and included seven elbows.

As it turned out, the drain was installed in the nick of time, for, on January 16, 1916, Pomona and vicinity was visited by a storm which for destructiveness was perhaps the worst in the city's history. Bridges and culverts were washed out right and left, as well as long stretches of paved highway. Very extensive damage was done, the storm waters undermining and ruining many structures which had been placed with reasonable expectations of permanence.

It did one's heart good, however, to see how the new corrugated storm drain stood up and did its work. By its successful operation thousands of dollars worth of property was saved which would otherwise have gone down to destruction.

The aspect of the matter which made the greatest impression on the author's mind was the absence of any noticeable damage from the rocks, gravel and dèbris which the flood waters carried through the corrugated pipe. An automobilist who was caught in the flood states that he was driving down the road at twenty-five miles per hour, during the storm, and the trash carried by the ditch into which the pipe empties was traveling as fast as was his car. The pipe was installed at a grade of about two per cent, and with the dèbris being carried through at such speed, it certainly underwent a service test. All sorts of material went through the pipe, including some boulders which were nearly a foot in diameter. These came bounding through, making the curves and all, and apparently never damaged the pipe in the least.

To-day the drain, after four and a half years of service, seems to be practically as good as new.

ACKNOWLEDGMENT.—Illustrations courtesy *The Highway Magazine*.



TWO VIEWS OF THE STORM DRAIN THAT WITHSTOOD THE RAVAGES OF POMONA'S WORST STORM

Standard Schedule for Grading Cities and Towns for Fire Insurance

Part II

With Reference to Their Fire Defences and Physical Conditions

By John S. Caldwell

Engineer, New England Insurance Exchange, Boston, Mass.

EDITORIAL NOTE.—*The first instalment of this article, appearing in the January issue, outlined the application of the Standard Schedule and discussed in part the place of water-supply. This portion concludes the discussion of the water-supply and takes up the fire department. The concluding portion will complete the fire department analysis and take up fire alarm, police, building laws, hazards and structural conditions.*

IN considering the minor distributors and gridiron system, 6-inch is considered the minimum size satisfactory for hydrant supply in residential districts to be closely gridironed with 6-inch cross-connecting mains at intervals not exceeding 600 feet; or where initial pressures are high, a satisfactory gridiron may be obtained by a liberal per cent of larger mains cross-connecting the 6-inch at greater intervals; in new construction, 8-inch should be used where dead ends and poor gridironing are likely to exist for some time, and 6-inch only where blocks are 600 feet or less in length; in high-value districts the minimum size to be 8-inch with cross-connecting mains at distances as given above; 12-inch and larger mains to be on the principal streets and for all long lines not cross-connected at frequent intervals.

The mains of the distribution system should be of satisfactory quality and properly tested for soundness and tightness of joints. The use of cast iron pipe under pressure double that specified for the class is considered as introducing an unreliable feature, particularly where pressures are raised for fires; tests before back-filling the trench and service records of several years may, however, be assumed as offsetting this defect in part.

Electrolysis conditions should be studied and methods of prevention applied.

The distribution system should be equipped with a sufficient number of gate valves, so located that no single case of accident, breakage or repair to the pipe system, exclusive of arteries, will necessitate

the shutting from service a length of pipe greater than 500 feet in high-value districts, or greater than 800 feet in other sections, and will not result in shutting down an artery; all valves to be inspected yearly and large valves more frequently, and be kept in good condition. The presence of some valves operating in opposite directions is to be considered the equivalent of unsatisfactory condition, ranging from fair to poor, depending on the number and importance.

In considering hydrant distribution it is readily apparent that proper distribution depends first upon whether the system is on a direct hydrant or engine stream basis, realizing, of course, that wider distribution could be permissible where engines were ordinarily used than where hydrant stresses were utilized, also that the fire flow required for the district is a determining factor, as the same distribution cannot be expected in a residential district as would exist in a manufacturing or mercantile section. The required fire flow is determined and the following table used:

ENGINE STREAMS

Fire Flow Required, Gallons Per Minute	Average Area Per Hydrant Square Feet
1,000	120,000
2,000	110,000
3,000	100,000
4,000	90,000
5,000	85,000
6,000	80,000
7,000	70,000
8,000	60,000
9,000	55,000
10,000	48,000
11,000	43,000
12,000	40,000

DIRECT HYDRANT STREAMS

1,000	100,000
1,500	90,000
2,000	85,000
2,500	78,000
3,000	70,000
4,000	55,000
5,000 and over	40,000

Hydrants should be inspected in the spring and fall of each year, after use at fires during freezing weather, and daily in high-value districts during protracted periods of severe cold.

The standard requirements for hydrants specify that they should be able to deliver 600 g. p. m. with a loss of not more than 2½ pounds in the hydrant and a total loss of not more than 5 pounds between the street main and hydrant outlet; they should have not less than two 2½-inch outlets and also a large suction outlet where engine service is necessary. They should also be of such a design that when the hydrant barrel is broken off the hydrant will remain closed. Street connection should be not less than 6-inch in diameter and should be gated. Flush hydrants requiring chucks to be screwed on are considered undesirable, especially in sections of the country subject to heavy snow-storms, because of delay in getting into operation.

Fire Department

The subjects considered under the fire department are as follows:

1. Number of Officers
2. Number of Operators
3. Qualifications of Chief Officers
4. Tenure of Office of Chief
5. Appointment and Tenure of Office of Officers
6. Enlistment Requirements
7. Retirement Requirements
8. Number of Hose or Engine Companies (Apparatus)
9. Number of Ladder Companies (Apparatus)
10. Distribution of Companies
11. Total Required Manual Strength of Department
12. Manual Strength of Existing Companies in the High-Value District Considered
13. Engine Capacity
14. Reserve Engines
15. Condition of Engines and Hose Wagons
16. Fire-Boats
17. Powerful Stream Appliances
18. Chemical Equipment
19. Reserve Hose Wagons
20. Amount of Hose
21. Hose Larger than 2½-inch
22. Condition of Hose
23. Minor Equipment
24. Fuel
25. Repair Facilities
26. Horses
27. Suitability of Fire Stations
28. Discipline
29. Drills and Training
30. Responding to Alarms
31. Fire Methods
32. Conditions Affecting Fire Department Operations
33. Building Inspections
34. Records of Fires, etc.

In considering the number of officers the

Schedule requires that there should be a chief and an assistant or deputy chief for over two and up to twelve companies, and another assistant, battalion or district chief to each additional eight companies. There should be two officers to each engine, hose or ladder company; a captain and two lieutenants may be considered sufficient for a combined company. Call officers—that is, officers who receive some pay for services but who do not devote their entire time to fire department duty—and volunteer officers are considered as equivalent to one-half full-paid officers.

There should be a sufficient number of competent operators—that is, engineers, stokers and chauffeurs—so that one will be on duty at all times for each engine or motor-driven apparatus.

Chief officers should be experienced in fire service and a chief should hold office for an indefinite term and be removable only for cause after public trial. Officers' appointments and promotions should be based on examination, seniority and record, under civil service rules with tenure-of-office provisions. Privates' enlistment should be under civil service rules and based on physical and mental examination with satisfactory age, weight and height limits, permanency to be only after a satisfactory probation period of six months, special training and examinations being required for engineers and chauffeurs. Full-paid members should be retired at the age of 62 unless unusually efficient at that time; proper and ample means should be provided for pensioning men for long service or disability.

The amount of apparatus in service and regularly responding to alarms should be sufficient to properly protect the city and should be on the basis of companies required, it being assumed that each hose company will be provided with a hose-carrying vehicle and that in cities of over 100,000 population one-half the engine companies required for first-alarm response in high-value districts will be provided with a steam or automobile fire engine and a separate hose wagon; other engine companies may each have only a combined pump and hose wagon assigned to it.

Every properly equipped piece of apparatus regularly responding to alarms should be considered as a separate company,

whether so organized or not, except that to be considered as an engine company it must have an accompanying hose wagon or carry hose on the pumping equipment. Apparatus may be hand-, horse- or motor-drawn, and where 80 per cent of the apparatus is motorized the formula for automobile companies may be used.

FORMULA FOR NUMBER OF COMPANIES

P = Population in thousands for cities or towns under 50,000

Number of Engine or Hose Companies

1.0 + 0.14 P for Horse-drawn

0.85 + 0.12 P for Automobile

For cities 50,000 to 200,000

4 + 0.08 P for Horse-drawn

3.4 + 0.07 P for Automobile

For cities having a population in excess of 200,000, the number of engine or hose companies depends on the distribution and on the ability to handle two simultaneous fires without leaving all other sections of the city unprotected.

In certain cities a number in excess of the above will be required, depending on the structural conditions found in the city. Where the topography and general layout of the city require for proper distribution a greater number of companies than determined by the formula, the deficiency is applied under the item of distribution of companies.

In cities almost solely residential in character, such as suburbs in metropolitan districts, or where the city has small local high-value centers needing less protection than the formula for companies calls for, the estimate will be based on the population corresponding to the fire flow believed necessary, except that where such cities have congested shingle-roof frame districts, at least two additional companies must be provided to protect the city in case of a second fire.

The number of companies in service should be assumed as increased by companies available as outside aid, where, by regular assignment, the response of such companies is provided for to the district considered or to fill in; such increase to be on the basis of one outside company equalling one-half a company in service, but not to exceed a total increase in excess of one-third the total number of companies required. Where adequate provision is not made for mutual aid from outside aid companies, the full number of companies available within thirty minutes should be allowed as a credit equal to one-third the points which this number decreases the deficiency in actual companies.

NUMBER OF LADDER COMPANIES

In localities having five buildings three stories or higher there should be one ladder company; in places over 20,000 population the number of ladder companies should equal $1 + 0.03 P$; over 200,000 population the number of companies will depend on distribution. Where no ladder company is required, application should be made on the basis of deficiency in ladder equipment on other apparatus.

An aerial ladder must be provided in a district where five buildings are four stories or higher, and one ladder truck in five shall be of the aerial type.

In general, the distribution of companies should be such as to provide an engine or hose company within the following distances of every point in a district measured by the most direct route:

DISTRIBUTION TABLE

District	Horse-drawn		Automobile	
	Engine	Ladder	Engine	Ladder
Merc'l or Mfg..	$\frac{1}{2}$ -mile	$\frac{3}{4}$ -mile	$\frac{3}{4}$ -mile	1 mile
Closely built res.	1 mile	$1\frac{1}{2}$ miles	$1\frac{1}{2}$ miles	2 miles

Strength of companies should be maintained as follows:

Companies	Least Number of Men on Duty, Continuous Duty or Two-Platoon Systems	
	Day Time	Night Time
Within or Near High-Value Dists.		
Engine Company.....	7	9
Ladder Company.....	7	9
Hose Company.....	5	7
Water Tower Company.....	1	1
Other Districts		
Engine Company.....	5	7
Ladder Company.....	5	7
Hose Company.....	3	5

There are many modifying features to the above table, such as motor pumpers, drivers not performing fire duty, auxiliary squad, aerial ladder companies, etc., which would necessitate additional or less men per company than the table calls for.

In departments having call or volunteer members, with tappers in houses and places of business or sufficient tower bells, horns or whistles, four call or eight volunteer members may be considered as equivalent to one full-paid member, up to one-third the least number required to be on duty at all times. Volunteer members receiving pay for fire service shall be considered on call basis. Call or volunteer members sleeping at fire stations may be considered as the equivalent of full-paid men in estimating the night strength. With the two-platoon system, if proper arrangements are not made for the response of men on off-shift for large fires, the least number of men on duty as given in the above table shall be increased one-fourth. For outside aid companies regularly assigned in the running card and assumed as equivalent to companies in service, one-half the combined least

number of men on duty will be allowed. For outside aid companies available within 30 minutes but not regularly assigned, the actual least number of men will be allowed up to one-third the points which the combined least number of men on duty in these companies reduce the deficiency in men.

In considering engine capacity where the domestic water-supply cannot deliver at direct hydrant stream pressure a quantity in excess of the fire engine capacity in service plus one-third the required fire flow, there should be provided a total pumping capacity equal to two-thirds the required fire flow.

In cities of over 200,000 population and requiring fire flow for two simultaneous fires, engine capacity must be provided equal to two-thirds the total fire flow required for the district.

In cities where the fire flow required in the high-value district is less than that corresponding to the population but there is a residential district of large extent and high conflagration hazard, the engine capacity required shall be on the basis of a fire flow of 2,000 gallons in addition to the amount necessary to protect the high-value district, to provide protection for a simultaneous second fire.

Where fire streams are available, in the district considered, from a high-pressure fire system, its capacity shall be considered as engine capacity, except that if residual pressures are less than 250 pounds, actual engine capacity should still be provided.

In estimating engine capacity, reserve engines or engines from outside localities for which a regular assignment is made, they are to be considered at one-half actual capacity but not to exceed one-third the total engine capacity required. When provision is not made for mutual aid, the full engine capacity available within 30 minutes shall be allowed as a credit up to one-third the points which this capacity decreased the deficiency; capacity of engines to be that obtained at tests. Where no test capacity is available, no engine is to be considered at more than 80 per cent of its rated capacity, and no engine in excess of 1,000 gallons capacity.

In districts having a domestic water-supply capable of delivering at a residual pressure permitting direct hydrant streams a fire flow in all parts of the district in excess of the engine capacity available plus one-third the required fire flow, application

shall be made under "Adequacy of Water-Supply" and no deficiency applied for engine capacity, except that where buildings are four stories or higher some engine capacity, depending upon the pressures at which direct hydrant streams are available, may still be required.

Engines should be kept in good condition; the absence of annual tests and tests after repairs, in accordance with the National Board of Fire Underwriters' rules for testing, may be considered a deficiency. Hose wagons should be in good condition and of sufficient strength for the service and weight to be carried, and if automobile, should have motor of good capacity and in good condition. A fire-boat should be required where there is an occupied wharf frontage of one mile, and additional boats such as to give a proportion of one to each three miles of wharf frontage; total fire-boat capacity to be equal to one-half the required fire flow for the district protected. For privately owned fire-boats or tugboats with fire pumps and turrets, if operating only in the harbor and if arrangements are made for their regular response to water-front alarms and for their operation under the chief of the fire department, credit would be allowed equal to one-half the points which such boats decrease the deficiency in municipally owned fire-boats. If such boats are not regularly tested, this credit shall equal only one-third the points.

Suitable appliances should be provided for handling powerful streams, except where less than 1,000 gallons of water is available as direct hydrant streams or from fire engines, or where not more than five buildings in the high-value district considered are three stories or higher, these should include turret or monitor nozzles, siamese connections, deluge sets and cellar pipes, properly distributed. A water-tower or ladder pipe should be provided where five buildings are four stories or higher; water-towers are required in high-value districts having over ten buildings six stories and higher, such that one will be within $1\frac{1}{2}$ miles of every building six stories high.

Each piece of apparatus carrying hose or ladders should have two $2\frac{1}{2}$ -gallon extinguishers; and sufficient apparatus, either chemical engines, combination hose wagons or ladder trucks, should carry 35-gallon or larger chemical tanks to enable two pieces so equipped to respond to each first alarm.

Water-tanks operated in conjunction with booster pumps or compressed air or gas are considered the equivalent of chemical tanks. Companies carrying 150 feet of small hose for use on 2½-inch water lines are considered as one-half value of chemically equipped apparatus. Where static hydrant pressures are less than 60 pounds, allowance of one-half credit is made for chemical tanks on pumping engines.

There should be maintained in reserve at least one hose wagon for each twelve, or fraction thereof, steamers in service, or eight, or fraction thereof, automobiles. One or more reserve hose wagons should be loaded with at least 1,000 feet of hose, preferably 3-inch. Where more hose wagons are in service than called for, a reserve loaded wagon is not required.

Each engine or hose company should carry at least 1,000 feet of 2½-inch hose or larger and be provided with a complete spare shift; hose on reserve wagons may be considered as spare hose where two or less hose companies are required. For cities of less than 50,000 population, if more companies are provided than called for, the total amount of hose carried by all apparatus, divided by the required number of companies, would be considered as the average amount carried per company.

For hose companies responding to first and second alarms in mercantile or manufacturing districts where direct hydrant streams are used, at least half the hose carried on wagons should be 2¾-inch or 3-inch; if engines are used, and in all other districts, at least 200 feet of large hose should be carried on each wagon; large hose not to be required where less than 1,000 gallons of water are available as direct hydrant streams or from engines, or where not more than five buildings in the high-value district considered are three stories or higher.

Hose should be in good condition; a service of seven years should be expected before being in such condition as to require discarding; hose not over five years old should be used in important companies, and if not regularly tested such hose should be considered as in poor condition.

Complete minor equipment should be pro-

vided for each company, this to include shut-off nozzles from ¾-inch to 1¼-inch, and open smooth-bore nozzles from 1⅛-inch to 1½-inch, short ladders, portable extinguishers, salvage appliances, including water-proof covers and sufficient small equipment to enable the firemen to perform their work with the greatest facility and despatch.

Good-quality quick-steaming coal, and gasoline where automobiles are used, should be provided in sufficient quantities at convenient points and ready for quick handling.

Adequate and preferably department facilities for making ordinary repairs in any municipality, and major repairs in cities over 50,000 population, should be provided.

It is particularly desirable to have equipment standardized, such as wheels, poles, all hose couplings, playpipes, tips and minor equipment. Spare parts, fittings, tools, poles, wheels and tires should be kept on hand.

Suitable horses for horse-drawn equipment should be provided for all apparatus necessary for the required number of companies, reserve horses to be provided, equal to 5 per cent of the number in service, but not less than two horses when over six pieces of apparatus are in service. If hired horses are used or if horses are used for other than fire department purposes, they are to be considered as 50 per cent deficient.

Fire stations should be adapted for the service as applying to ease and quickness of response; each engine or hose company should have hose-drying facilities and engine heaters provided for steamers depended upon for first streams.

Provisions should be made in complete printed regulations for control of the department and authority given the chief to enforce them, subject to review or confirmation by the supervising body or the civil service commission. Discipline should be rigidly maintained and fines and suspensions impartially imposed and sustained.

Drills in charge of a competent officer should be regularly held at a drill tower, for all company members of the department. Drills should be classed as deficient if any for newly enlisted men, or if no drill tower is provided.



MC BRIDE PARK, ISLAND OF KAUAI, H. I.

A County Park in Hawaii, to Be Maintained by the Life Insurance of the Giver

McBRIDE Park is situated in the Hawaiian Islands on the Island of Kauai. It occupies the crest of one of the low foothills overlooking the sea, with a fine view upon fertile valleys, cane fields, and back to the high mountains. The hillsides are covered with pineapples, and the lower reaches with sugar cane, but the top has been planted with a splendid forest of eucalyptus and pine trees. Ornamental shrubs and trees, beautiful flowering beds, fountains, and some fine statuary decorate the park, which occupies about 100 acres.

It was built as a private park by Mr. McBride, and is in the open country, ten or fifteen miles from a town of any size, and

with no American residences within a mile or more. Mr. McBride made this park himself and maintained it for the first few years. He then had his life insured for \$60,000 with the provision that at his death this \$60,000 should go to the maintaining of the park. After carrying it for a few years, he turned it over to the County Commissioners of the Island of Kauai with the understanding that the commissioners were to keep up the life insurance and at his death they were to have the park as a county park with the \$60,000 life insurance for maintenance. This is believed to be one of the most unique methods of maintaining a public park that have been attempted.

Provision for Playgrounds in New Suburban Sections

A Kansas City bank president suggests that local laws should provide that in every new suburban section opened near any city there shall be one or more squares or blocks of land set aside permanently for playground and recreational activities. This, he feels, will increase the value of surrounding property and thus provide ample compensation for the real estate owners who develop the new area. It will also help to provide opportunities for healthful, wholesome neighborly activities, for play and recreation, for community organization, and for such joyous neighborliness as American communities sadly lack and greatly need.—*The Playground*.

Forward Steps

Reported to THE AMERICAN CITY

by Municipal Officials & Department Heads

City Engineers

Good Roads for Westerly

WESTERLY, R. I.—Because Westerly is located on the Rhode Island-Connecticut state line, it will have added to its already good system of improved roads more than 25 miles of state highway by next summer.

The state of Connecticut is just completing 18 miles of bituminous construction from Norwich, Conn., to Westerly, through one of the wildest and most picturesque sections of eastern Connecticut. Poor roads and a rugged country have been responsible for a sparse population in this region. The road makes a direct route to the shore resorts of southern Rhode Island—Watch Hill, Narragansett Pier and Newport—from Hartford, Conn., and the Connecticut River valley to the north of Massachusetts.

Early in December this road was practically graded, and it is now open to traffic. The seal coat of bituminous construction yet remains to be completed. The tar is on the ground, and the work will probably be finished by summer. The continuation of this road through Westerly along the shore towards Narragansett Pier is being constructed by the state of Rhode Island. Eight miles are practically finished, and the remaining gap of ten miles between the Westerly section and the section built a year ago at Wakefield has been contracted for.

Westerly is installing a sewerage system, but because of labor conditions progress has been very slow. The problem facing the Highway Commission is the reconstruction of nearly 7 miles of highways, where the sewers are being installed. They expect to secure the services of a trained highway engineer, not only for this work but to take care of all the roads of the town in the

future. With the rebuilding of its roads after the damage caused by the installation of the sewerage system, Westerly expects to have more and better roads than any other town in the state.

THOMAS McKENZIE,
City Engineer.

Mayors

Municipal Handling of Garbage

GRAND RAPIDS, MICH.—This city owns and operates its garbage collection system, and very satisfactory results have been obtained under this plan.

In collecting the garbage, both wagons and motors are used, the vehicles being fitted with large covered tanks. The garbage collectors carry with them steel baskets into which they empty the garbage at each residence, and from which the refuse is dumped into the steel tanks on the trucks.

Each property owner or tenant who wants the garbage collection service is required to pay for his own garbage can. Collections are made regularly once a week in winter and twice a week in summer. The garbage must not be mixed with paper, cans, or ashes; such rubbish is disposed of by the individual property owner. The garbage is sold under contract to the American Stock Food Company located at Sullivan, Mich., about twenty miles from this city. When collected, it is loaded on cars at a central loading station, and shipped to that point, where it is fed to hogs.

The broad idea in handling the garbage municipally is that it discourages people from burying it, burning it, or otherwise disposing of it in an unsanitary manner. The cost to the property owner for the collection of his garbage averages about \$1.24 a year.



THESE TRUCKS ARE EASILY EMPTIED INTO GONDOLA CARS

The accompanying illustration shows the municipal trucks discharging their contents into a gondola car for shipment. The city has in operation two $3\frac{1}{2}$ -ton and one $2\frac{1}{2}$ -ton United trucks. They are driven alongside the car, and by a simple but ingenious arrangement the steel bodies are mechanically lifted over the open car and their contents dumped.

JOHN McNABB,
Mayor.

Recreation Departments

Winter Sports Promoted

MINNEAPOLIS, MINN.—The city of Minneapolis, climatically, is ideally situated for the carrying-on of all outdoor winter sports. Plenty of ice and snow can usually be depended upon during the season, which is about two months' duration. Good use is made of all the facilities. The estimated attendance at park rinks during the season of 1920 was approximately 1,000,000.

That the people of our city may enjoy the greatest

of all winter sports—skating, 23 rinks are maintained and are located so that a rink is available within walking distance of any part of the city. Each rink is well lighted, and the ice is kept in as good condition as is possible in an outdoor rink. Warming-houses are provided at all rinks, where wraps may be checked and skates rented.

In connection with the rinks for general skating, five hockey rinks are maintained. Hockey became such a popular sport, and so many teams were organized and wished to play, that it was found

necessary to light the rinks, so as to make evening play possible.

The following is a brief description of the lighting system used:

Size of rink 176 x 70 feet

Lighted area 200 x 80 feet

Sixteen 500-watt lights, with white enameled steel reflectors, which total 8,000 watts.

The lights are suspended from two cables, 18 feet from the ice, eight to a cable, each eight 25 feet apart.

The distance between cables is 40 feet.

A system of this arrangement gives a light which is equal to sunlight for playing purposes.

A formal program of winter activities is promoted, which has proved very popular.

Hockey in Minneapolis has reached a stage where it is the most entertaining and biggest attraction of the outdoor winter



A SKATING RINK IS WITHIN WALKING DISTANCE OF ANY PART OF MINNEAPOLIS

sports. The season of 1919-1920 saw twenty-four teams, divided into three leagues (Senior, Junior No. 1, and Junior No. 2) playing in the municipal leagues. The leagues had a wonderfully successful season, and all their games were attended by large crowds, who greatly appreciated the fine brand of hockey furnished by the players.

Skiing has long been a popular sport in Minneapolis, but as carried on by private organization it did not offer much opportunity for any one but the expert. During the latter part of the winter season of 1920, a Municipal Ski Club was organized. It met with immediate success. Three tournaments were held, with 88 participants, and approximately 3,000 spectators were present. The program of events included jumps of various descriptions, and embraced Senior, Open, Novice, and Boys' and Junior classes. With the increased interest shown this season, the club expects to make use of two slides, one for novices and one for experts.

The Municipal Hiking Club, whose members hike the year around, plan on organizing a Cross-Country Ski Club. This is a phase of the sport that everyone can indulge in and enjoy.

The Norwegian American Skating Club, an organization of this city, with an aim to advancing skating contests, fancy skating, and skating as a recreational measure, affiliated itself with this department last year, and under the organization of the Municipal Skating Club, a number of interesting meets were held. Each year a series of five skating meets are run for the boys. The city is divided into four sections where races are held for the boys living in those districts, respectively. The contestants placing first, second and third in these sectional meets, skate at a central rink to decide the city championship. No previous registration is necessary, the only restriction being residence in the district where the meet is held. The boys are divided into three classes according to height, namely: 5 feet 3 inches and under; 5 feet and under; 4 feet 9 inches and under. The events were: 50-yard dash; 100-yard dash, and 220-yard dash.

A great deal of interest in coasting and tobogganing is shown each year. Three natural hills are maintained to accommodate the large number of enthusiasts in this

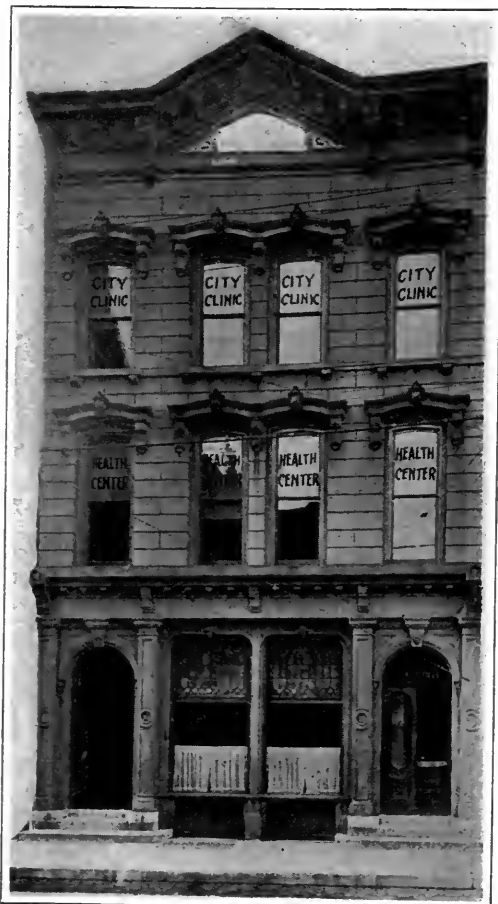
branch of outdoor activity. The hills are well illuminated, and every afternoon and evening a great number of people take advantage of this opportunity.

K. B. RAYMOND,
Supervisor of Recreation.

Health Departments

An Active Health Center

GLOVERSVILLE, N. Y.—The public health work of Gloversville is carried on from a central building. This consists of two floors, on the first of which are located the offices of the Health Officer and Registrar, plumbing and sanitary inspectors, and the Clerk, and the conference room of the city Board of Health, also the distributing sta-



THE GLOVERSVILLE HEALTH CENTER

tion for the county laboratory supplies and antitoxins. These offices are well equipped and centrally located.

All vital statistics are kept in the Registrar's office for public reference. All the communicable diseases are reported to the Health Officer, who sends out a nurse to investigate the cases, and make reports on the housing conditions, family history, sources of infections, instructions to families isolated, etc. A report of all these diseases is filed monthly with the Board of Health.

The plumbing inspector investigates all new plumbing work, to make sure that the fittings are standard and that there are no leaks; also that all regulations are complied with. He issues plumbing licenses and looks after all complaints of defective plumbing and sewer connections.

The sanitary inspector attends to the complaints of public nuisances and any other matters of interest to the public health, by regular weekly inspections.

The Health Center accommodates the county distributing station for laboratory supplies and antitoxins. This is of great assistance in case of epidemics, because of the time saved by not having to send to the state, and in winter a great amount of trouble from freezing and from slow transportation will be eliminated. This station is in charge of the city technician, who has certain hours for the distribution of supplies. The city laboratory is located in the hospital building, which is apart from the Health Center. The laboratory work is of a diagnostic type for the most part, and is under the direct supervision of the city bacteriologist. Reports from this division of

the public health work are sent to the state department monthly.

The meat and dairy inspector scores the dairies and approves the milk brought into the city for sale. He inspects the markets and other places where food is sold.

On the second floor are the two clinics, one for the tuberculosis work of the city and the other for the venereal work. Each clinic has a public health nurse on duty. The tuberculosis nurse investigates any suspected cases reported by the doctors, to see that the patient is properly attended, that he is isolated from the rest of the family, that his food is correct, and whether the case should be transferred to a sanitarium. This nurse does the diphtheria culture work for the city. The cultures are taken and sent into the laboratory for examination and then reported to the Health Officer.

The venereal clinic is very well equipped with all the necessary apparatus for carrying on the work properly. A physician is in charge of the public clinics held twice each week, at which time new patients are examined and treatments are given. The nurse investigates new cases and does general social follow-up work. Outside of the clinic hours her duties are to look up the family histories, locate the source of infection if possible, look up the patients who are negligent about their treatments, and give instructions as to the care of the patient in the home. Blood Wassermanns are taken at the clinic, but are sent into the state laboratory for examination. This clinic occupies two large rooms, one a consulting-room, the other a waiting-room.

A. L. JOHNSON, M. D.,
Health Officer.

Forward Steps Gathered Here & There

Schools Aid in Fire Prevention Campaign

Texas is making effective use of the public schools in its fire prevention campaign. Fire prevention education is a fire cure. The fire waste in lives and property in this country is appalling. It is believed that instruction, especially to the young in the schools, will

greatly reduce this vast fire waste. Therefore, the State Fire Commission, which under the laws of the state of Texas makes rates, has passed a resolution granting a credit of 3 per cent on their key rates to such cities and towns as teach fire prevention in their schools. This course of instruction is not onerous; it occupies but little

of the time of the pupils of the schools, and calls for but one or two simple text-books. This proposal has met with quick approval by mayors and school superintendents in Texas.

The school program laid down by the State Fire Marshal follows:

"In the third and fifth grades one period each week, of from fifteen to thirty minutes, must be given to the study of fire prevention. This period must be named 'Fire Prevention' on the daily program. The book to be used is 'Safeguarding the Home Against Fire.' In the third grade this book shall be in the hands of the teacher; in the fifth grade it shall be in the hands of the pupils.

"In the sixth and seventh grades one theme each term must be written on fire prevention. In the High School one theme each term must be written on fire prevention.

"The work in the third and fifth grades, aside from the use of the above-named book, may consist of written or oral stories along fire prevention lines; the discussion and reports of large conflagrations, both state and national; the discussion and reports of fire hazards, and particularly local hazards and conditions. 'Uncle Jim, the Fire Chief,' an adopted state text-book in the supplementary reading course of the intermediate grades, might well be used in this course.

"The work in the sixth and seventh grades, of one theme each term, should consist of the study of the large conflagrations; a study of the child's own home and its hazards; a study of the protection against and the removal of his own home hazards; a study of similar school conditions; a study of the modern means of fire protection; a study of the ways of turning in a fire alarm.

"The work in the high school, of one theme each term, should consist of the study of the great conflagrations of history; a study of the fire department of the city; a study of fire hazards in the student's own home and school; a study of the best use for civic progress to which the preventable fire waste might be applied; a study of the progress of fire prevention in the past ten years.

"The theme work in the high school and the sixth and seventh grades might well be done during the months of October and April."

A. P. WOOLDRIDGE,
State Fire Marshal.

City Planning in Buffalo

BUFFALO, N. Y.—The Council of Buffalo, consisting of five Commissioners, including the Mayor, has been operating under the commission form of government since January 1, 1916, and the many details connected with the location of garages, laundries, industries, etc., demanded so much attention that the need of zoning regulations was soon apparent. Consequently, about

two years ago a City Planning Committee of six city officials (heads of bureaus) was appointed to devise a comprehensive planning and zoning system for the city of Buffalo and to report to the Council.

The committee was instructed to prepare a zoning system first, but the necessity for a new municipal building became so pronounced that the matter of a civic center forced itself for consideration, and no little time and study have been given this matter concurrently with the study of the zoning problem. It is hoped soon to present some definite zoning regulations.

In the studies made, due attention was given the danger of super-centralization in a large, growing city like Buffalo. Subcenters were considered highly advisable for the grouping of minor units. Three city planning experts were consulted upon this matter in an advisory capacity, and a report favoring the policy of a civic center was made by the committee to the Council. The Council, however, deemed it advisable to submit the question of desire for a civic center to a vote of the people at the November general election.

Meanwhile the Buffalo City Planning Association was formed, representing over 100 different organizations with a membership of over 30,000, for the purpose of co-operating with the City Planning Committee and of educating the public in the principles of city planning.

This association did a wonderful work in the matter of publicity. Talks and stereopticon lectures were given before many organizations, clubs and societies at noon, afternoon and night, whenever the opportunity presented. The women were of great service in the cause.

The vote was 42,000 in favor with 30,000 against, and considering the unfavorable conditions—strong newspaper opposition, many other public questions claiming interest and possible large expenditures, and a stormy election day—it is deemed a notable victory—one reflecting the strong civic spirit that prevails in Buffalo, and it is hoped that this article may be helpful to other cities, even as a previous article published in THE AMERICAN CITY on Milwaukee's similar victory last April was helpful to Buffalo.

HARRY J. MARCH,
Executive and Engineer, City Planning
Committee,

A New City Office

SACRAMENTO, CALIF.—Sacramento has added to its staff of municipal officers a City Landscape Architect. Realizing that unless such an office were kept entirely free from political control it would have no attraction for the type of man the city wanted to fill it, the position has been made appointive and not elective.

The duties of the City Landscape Architect include most of the functions ordinarily expected of the visiting consultant, along lines of city planning and of general landscape architecture. In addition to these duties, he must, in connection with the park board, take general charge of planting within the city. Sacramento has a wise ruling which forbids the moving, planting or trimming of street trees without the consent of the park board. The Landscape Architect is to have charge of this work also, together with the park board.

The position has been recently filled for the first time by the appointment of Frederick Noble Evans. Mr. Evans comes to California from the University of Illinois, where he has been in charge of the professional school of landscape gardening, lec-

turing also to the classes in city planning. Some time ago Dr. John Nolen prepared a most valuable report on the parks of Sacramento. This report and the plans which accompany it will be followed as far as possible in the working out of the park system for the city. In cities where city landscape architects are permanently employed, the consultant will have the advantage of having the ground prepared for his suggestions, and of an intelligent and competent support in working out the plans.

There is little doubt that the time will come when most cities of size will create such an office, for the reason that it brings together certain functions of city administration too often separated. The person who fills the office should be able to administer the affairs of the parks both from the business and from the creative side, and should be sufficiently trained in the principles of city planning to work toward the coordination of all branches of city activity, such as traffic, zoning, districting, selection of building sites, etc. Most of all, he must have an interest in the individual lot owner and make him realize his civic responsibility.

LUCY LOWE.

The Problem of Unemployment

IN a statement by the American Association for Labor Legislation, a number of valuable suggestions are made for communities now facing problems of serious unemployment. A part of the report follows:

"The appointment of an unemployment committee by the mayor, if improper political influence is guarded against, insures semi-official standing and greater prestige. Membership should include all classes concerned, such as employers, workingmen, public officials, social workers, civic leaders, and representatives of churches, lodges and women's clubs. To carry out preventive measures, permanent organization rather than temporary activity during the crisis is essential. Educational work, based upon careful information gathered from employment offices, relief agencies and all other available sources, should be undertaken in order to bring the facts of the unemployment situation home to every citizen, with emphasis upon civic and industrial responsibility.

"Start or push forward special public work, using private contributions in time of urgent need if public funds cannot be obtained. This should not be "made" or unnecessary work, but needed public improvements in as great variety as possible, so as to furnish employment to other sorts of persons besides unskilled laborers. Give preference to resident heads of families if there is not enough work for all applicants. Employ for the usual hours and wages, but rotate employment by periods of not less than three days. Supervise the work carefully. To avoid the difficulties of emergency action, make systematic plans for the regular concentration of public work in dull years and seasons, by special provisions in the tax levy, or by other appropriate method. Urge the repeal of laws restricting cities to contract work. Secure the aid of state and national officials in stimulating local action. Steady the employment of the regular force, retaining employes on part time in preference to reducing their numbers."

Bituminous Macadam Pavements in a New Jersey Town

By E. B. Lloyd

Town Superintendent, Montclair, N. J.

DURING the seasons of 1919 and 1920, the town of Montclair, N. J., carried out an extensive paving program, a small part of which consisted of the resurfacing of about five miles of streets with bituminous macadam built by the penetration method. All these streets were on more or less of a grade, and it was desired to have the surfaces left in such shape that there would be the least tendency towards skidding or slipping in wet weather. It was therefore decided to put on the bitumen in one application and to omit the seal coat for at least a year.

In each case there was an old telford foundation upon which to build. After the old macadam surface had been removed and spread to serve both as gutter and shoulder, the telford was renewed where needed. Any further inadequacies which became apparent after rolling were made up with the old macadam, and the foundation was brought to an accurate grade. The depth of the wearing surface was made 3 inches after compression with a 10-ton roller, and consisted of stone passing a $2\frac{1}{2}$ -inch screen and retained upon a $1\frac{1}{2}$ -inch screen. This wearing surface was rolled until absolutely firm and until there was no movement under the roller, and was then given an application of asphalt at the rate of $1\frac{3}{4}$ gallons per square yard of surface. After the application of the binder coat, stone passing a $\frac{3}{4}$ -inch screen and retained upon a $\frac{1}{2}$ -inch screen was spread on the surface to fill the voids, and the pavement was then well rolled. Before opening to traffic, the



APPLYING THE BITUMINOUS BINDER, AND THE FINISHED ROAD IN MONTCLAIR, N. J.

surface was given a second covering with the $\frac{1}{2}$ -inch stone, and enough was spread to leave a slight surplus after entirely filling the voids. Approximately five miles of streets were resurfaced in this manner during the season of 1919, the work extending from early May until late October.

In the spring of 1920 some defects appeared in the last-built roads, which could largely be accounted for by weather conditions at the time of construction. The earlier roads came through the severe winter without damage or the appearance of the slightest defects, and it was decided not to give these streets a seal coat until such time as it may be required in the future. After all defects had been corrected in the streets designated for sealing, the surfaces were carefully swept both by a mechanical sweeper and by hand, and a seal coat of $\frac{3}{4}$ -gallon per square yard was applied, cov-

ered with the $\frac{1}{2}$ -inch stone, well rolled, and opened to traffic. Asphalt of the same penetration (90) as the binder course was used for the seal coat.

In addition to the slightly rough surface obtained as a result of this method of construction, the postponement of the seal coat

for a year appears to be advantageous in that any defect in workmanship or material is sure to appear after the street is subjected to a winter's weather and traffic, and it can then be easily repaired before the seal coat is applied and the street is finally completed.

Street Lights to Advertise Charity Campaigns

A NEW and unique feature of the use of street lights for the advertising of a charity campaign was evolved and used in Schenectady, N. Y., to call attention to the Fourth Red Cross Roll Call, held during the first week of December, 1920. A large Geneva cross covered with red cheesecloth was placed on either side of each street-lighting globe along the main street. In order that there should be no diminution in the amount of light from the street-lighting standard, no cloth was placed on the sides toward the roadway and the sidewalk.

The idea of using the street lights in this manner was originated by W. D'A. Ryan, director of the Illuminating Engineering Laboratory of the General Electric Company. This is probably the first time that street lights have been used in such a manner, but it is believed that the idea will be copied by other cities when local or national drives or campaigns are being actively carried on.

The Geneva crosses, which were 4 feet wide and built of basswood, were firmly secured to the lighting poles by blocks at the bottom drawn together by 16-inch bolts. The framework with the cloth already on it was erected by carpenters from a tower wagon belonging to the street railway company. The fact that Schenectady went over the top for the first time in a Red Cross drive speaks well for the success of this advertising feature. Similar designs which are distinctive to certain local or national charitable organizations may well be featured in this way during all types of civic campaigns.



A UNIQUE FEATURE IN CHARITY CAMPAIGN
ADVERTISING

New Segment Block Storm Sewer

An Outline of a Design of a Sewerage System on Flat
Grade with Provisions for Extensions

By Frank LeCocq

City Engineer, Aberdeen, S. Dak.

THE city of Aberdeen, S. Dak., located in the north central part of the state, has a population of about 16,000 and is steadily growing.

The territory within the city limits is about 2,000 acres. The general slope is from west to east and from north to south, extending towards Moccasin Creek, south-east of the city. The surface of practically the entire area within the city limits and the surrounding territory is extremely flat, varying not more than 10 feet in elevation, the extreme difference in elevation being 30 feet. The topography is characterized by a series of slight elevations and depressions, and a large drainage area enters the city from the northeast through a ravine. Moccasin Creek is very sluggish and acts simply as a storage reservoir for surface water. After traversing a large territory this creek empties into the James River. The Moccasin forms an irregular loop, over 50 miles in length, south of the city, and comes back

within 7 miles southeast of the city. In this 50 miles there is only 13 feet of fall.

The Present Sewers

The city has two separate sewer systems. The sanitary sewers are used for building-connections only. All of the sanitary sewage has to be pumped. The present storm sewers are small in size, and the grades are very flat, making it difficult to keep the sewers clean, and they are very inefficient. During heavy rains large areas of the city are flooded and considerable damage is done.

About eight years ago a storm-sewer system was designed by a former city engineer. Plans were submitted for a complete storm-sewer system which was supposed to meet the future growth of the city. According to the plan the city would be traversed with fourteen small trunk lines ranging in size from 24- to 36-inch. All these outlets would be located east of the city along Moccasin



THE SECTION WHERE THE 90-INCH SEGMENT BLOCK SEWER IN ABERDEEN, S. DAK., IS
ENLARGED TO 96 INCHES

Creek.

Two of these small trunk lines were built in 1914, making a total of four outlets at the present time. Each of these lines serves certain particular districts, and they are too small to provide for future extensions. After spending about \$50,000 on these two small trunk lines, it was found that other lines would have to be put in immediately to serve territory where paving was being petitioned for. Several petitions for paving had been filed with the Board of Commissions, but had to be denied, as there were no storm sewers to serve these particular streets.

Investigations

The writer was instructed to make a careful study of the storm-sewer problem. It was found from the records that the average annual rainfall for Aberdeen is about 30 inches. A study of the rainfall records covering a period of about 25 years showed that out of 47 storms there were 7 storms in which the rainfall exceeded 1 inch per hour. There were 4 storms during which the rate was from $\frac{1}{2}$ - to 1 inch per hour, and the rate during the remaining 36 storms was less than $\frac{1}{2}$ -inch per hour. It was found that the storm sewer serving the business district of the city was entirely inadequate and had to be relieved. A large number of small 8- and 10-inch laterals were completely filled with mud. After a careful study it was concluded that a different system would have to be designed in order to take care of the present and future growth of the city.

Design of System

On June 16, 1919, the writer submitted complete plans and specifications for a storm-sewer system. This system is composed of a trunk line running north and south through the central part of the city. The outlet is southeast of the city limits and enters Moccasin Creek. All of the present east-and-west lines are intercepted by the trunk sewer; other laterals from 18 to 36 inches to be added in the future will enter the trunk line from the east and the west. The main trunk line is $2\frac{1}{2}$ miles long, ranging in size from 96 to 60 inches.

This system resembles a symmetrically shaped tree with the main trunk line gradually growing smaller from the outlet up, and with branches spaced equally extending into outlying districts. The plans also pro-

vide for an open ditch 6 miles in length, extending southeasterly from the outlet and cutting off the 50-mile loop of Moccasin Creek. A fall of 13 feet would be obtained by the construction of this ditch, and the sewer outlet would be connected directly with the James River.

The system as designed will take care of about an inch of rain per hour. It was found that the cost of designing the system to provide for storms of the greatest intensity would be too great. The sewers have to be laid on very flat grades, and in order to provide for the maximum rainfall the sizes would be prohibitive. The only thing possible under these conditions was to utilize all the fall available, which is 2 feet to the mile, and to design such a system as is feasible in cost but which would take care of the drainage in a reasonable way and greatly improve present conditions. The main outlet will have a capacity, flowing full, of about 12,000 cubic feet per minute with a velocity of 3.7 feet per second.

The ultimate cost of this system will be much less than if the former plan was carried out, since the cost of large sewers per unit of carrying capacity is much less than for small sewers. With a central trunk line the materials can be easily and economically added from time to time as they become necessary.

The plans for this system were adopted by the city. The contract for the main trunk line was let on August 1, 1919, to J. J. Dunnegan, of Shenandoah, Iowa. The laying of all of the 96-inch and 90-inch pipe, 4,400 feet in length, has been completed this year. The sewers included in the contract will be finished in 1921. The cost of the work will be \$325,000.

Material Used and Methods of Construction

The sewer is being built of segment block of the interlocking type. This block is manufactured by the Red Wing Sewer Pipe Company, of Red Wing, Minn. This type of block has just been placed on the market, and the Aberdeen job was the first on which the new block was used. The block is easily laid and has been satisfactory for this type of construction. It is not laid with cement joints, only a thin grout being used in the bottom and on top of the sewer after a section has been laid. Between the top and bottom sections of the forms, four jack-screws are used for raising and lowering

the top part of the form. This type of form has proved to be of great value, as it is easily moved and put back in the proper position.

Several hundred feet of the 96-inch sewer had to be laid in quicksand. Progress was very slow, but the sewer was laid satisfactorily by placing a bed of gravel under it up to the quarter line.

When the work is completed, Aberdeen

will have the foundation for an adequate system of drainage and will undoubtedly enter into an extensive paving program, which has so far been held up for lack of proper street drainage. Although the city is located in a swamp, it will nevertheless become a place where frog-ponds will be things of the past. When completed, it will mean more to this city than any other public improvement ever undertaken here.

Does It Pay to Clean City Streets in Winter?

Snow Removal Expedites Transportation and Saves the Road Surface

THE scene depicted below is a familiar one in cities where snow is not removed from business streets shortly after a storm has ceased. Can you imagine the damage incurred to a pavement when a dual rear wheel of a motor truck having four or five loose chains locked over it starts thrashing around like the one in the illustration? The chains strike a fearful blow on the snow and ice, and soon reach the pavement and continue the damaging work. Perhaps many engineers will think this is only an incident, but in a number of cities all but the very hardest pavements have been damaged to considerable extent in this manner. There is not only the street to be considered—think of the damage to the truck when as each chain strikes the pavement, the wheel is instantly and momentarily checked in its speed, thrusting a great additional torque on the axle. Transportation facilities in cities are greatly hindered by snow in the streets. Snow should not only be removed from the center of the roadway to permit a single or double line of traffic, but should be removed from near the curbs in order that traffic may have ample space to operate and manoeuvre.

The various methods of snow removal which have been developed within the last two years include the use of tractors with either pusher-type or V-shaped locomotive plows, several types of machines for loading snow into trucks, including the "snow tank" and material-handling machinery slightly modified to handle snow and ice. The use of motor street sweepers has been advocated and will, undoubtedly, be successful if used from the very start of the



THRASHINGS THAT RUIN BOTH PAVEMENT AND TRUCK

snowfall to continually push the snow to the sides of the street where it may be taken up by hand or by different types of machinery. Such devices promptly used should prevent damage to pavement and trucks with its consequent losses and congestion of traffic.

Automobile Headlight Regulations

By James R. Cravath

Illuminating Engineer

IT is interesting to note that at the present time states comprising about 25 per cent of the total automobile registrations in the United States have adopted the rules recommended jointly by the Headlight Specification Committee of the Illuminating Engineering Society and the Standards Committee of the Society of Automotive Engineers. Headlight regulations adopted by many states heretofore, with the idea of reducing the dangers of glaring headlights, have until the last two years necessarily been rather indefinite in specifications, because those expert in lighting matters had not themselves made the necessary tests to formulate definite specifications as to what could be permitted on the road without causing dangerous headlight glare. The committees referred to, however, have worked out such specifications, so that they are available for all states and municipalities desiring to pass regulations which represent the best unbiased expert opinion available.

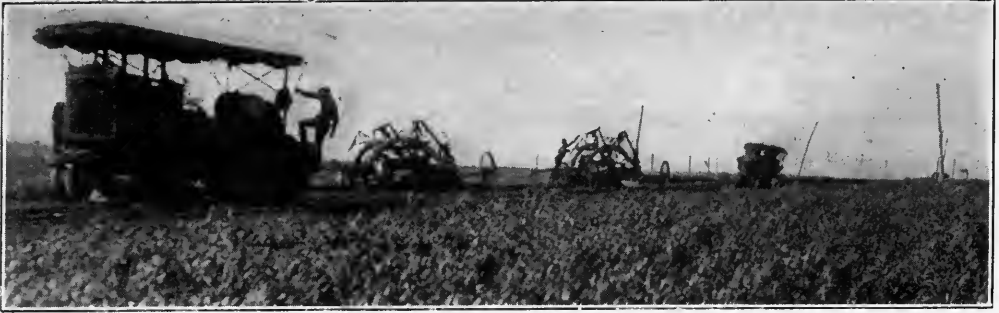
These rules specify nothing as to the kind of appliances to be used on an automobile, but specify in candle-power at various points the results that must be attained by automobiles using the highway, if they are not to emit dangerous glare or dazzle and at the same time give sufficient light for safe driving and reasonable speed. They specify the candle-power in maximum and minimum values to be permitted at certain points 100 feet ahead of the car. The measurement of this candle-power would have been a rather elaborate operation a few years ago, but, thanks to recent developments in light-measuring apparatus, a small and relatively inexpensive, easily operated instrument is now available called a foot-candle meter, with which this can be done with reasonable accuracy by any intelligent man after a little instruction. The states which had adopted these standard specifications up to

October 1, 1920, were Connecticut, New York, Pennsylvania, Maryland, Wisconsin, California, and the province of Ontario, Canada.

There was discussion at the last Illuminating Engineering Society convention, both formally and informally, regarding feasible methods of enforcing these headlight laws. It appeared to be the consensus of opinion of the experts in these discussions, that while punishment of the worst offenders will doubtless be necessary in the enforcement of any such law, education of garage mechanics and car owners in the making of proper headlight adjustments and the equipment of public garages with the necessary things to make such adjustments quickly and easily, are to be the most important elements in improving the general headlight situation. It was suggested that probably municipal testing stations would have to be established, where tests could be made with an instrument to determine whether a given car was violating the law, or certain officers would have to be equipped with instruments for making such tests on suitable stretches of road. The better equipment of public garages for headlight testing and repair and adjustments was strongly urged, and with proper law enforcement, it was pointed out, it would pay many garages so to equip themselves. The point was also made that headlight adjustments are difficult with most of the car equipment now on the market, and better appliances for focusing and pointing of headlights were urged.

It was evident from the discussion that the enforcement of these headlight laws will not take care of itself any more than the enforcement of various other laws on our books. The whole matter, however, is gradually drawing nearer to a satisfactory solution.

"If we are to regenerate our cities, to preserve their beauties, and to make them better, more is required than the good intentions of a group of technical experts or public servants; for this end a veritable civic conscience must be developed in all citizens."



HOLT TRACTOR PULLING BLADE GRADERS IN GANG MAINTENANCE WORK

A Comparison of Road Maintenance Methods

Team, Tractor and Truck Patrols Analyzed

By **George E. Johnson**

State Engineer, Lincoln, Nebraska

THE patrol maintenance system organized in Nebraska the first of April, 1920, has been in operation nearly a year, has covered a fairly good mileage, and offers a rather interesting and representative report.

At the beginning of the season, the five division engineers, each of whom has direct charge of a portion of the work on the state highway system, held meetings with the county boards of their respective divisions, at which time they took up the matter of county road maintenance and available funds. In nearly every county there were funds left over from the 1919 automobile license tax, and this amount, added to the minimum amount which the county board and the county treasurer estimated would be collected in that county for the 1920 automobile tax, constituted the total available fund for the maintenance expenditures on the state roads of each county.

Maintenance Methods

There are three methods of maintaining these roads, namely, by team, by truck, and by tractor. The team patrol consists of one man, who furnishes his own team and equipment, and who is paid an average of \$175 per month. It can be seen that there is no depreciation cost, nor feed cost, nor interest on teams to take into consideration when figuring the cost per mile for such maintenance.

The equipment necessary may be listed as follows:

- 1 six-foot blader
- 1 farm wagon
- 1 planer
- 1 scraper or fresno
- 1 plow
- Small tools
- 6 miles average team patrol section

Two men are required for the truck patrol method, and each is paid \$120 per month; the gas and oil are furnished by the county boards, which are, in turn, reimbursed by the state. This method is used where there is a large mileage to cover. The trucks used are part of the equipment turned over to the state by the war department, for use on state roads. The price of these trucks to the counties was the amount of freight and expense put on by the state, and averaged near \$1,000, varying according to the type of body. The price of the trucks, were the county to purchase them at market value, would average from \$3,500 to \$5,000 apiece. This would necessarily increase the cost of maintenance accordingly. The equipment usually found is as follows:

- 1 truck
- 1 scraper
- 1 maintainer
- 2 planers
- 1 scraper or fresno
- 1 plow
- 17 miles average truck patrol section

The tractor patrol method also calls for two men, and is used in counties where such equipment was already on hand at the be-

ginning of 1920, the county having purchased it for county work, or preferring it to the other methods used.

The equipment necessary for such a maintenance patrol would consist of the following:

2 highway maintainers
2 small tractors
Plow
Wisconsin planer
Buck scraper
Shovels
14 miles average tractor patrol section

Investigation of Methods

In order to determine the best methods of maintenance, the writer visited twenty-two different states and investigated the methods used and the results obtained. It was concluded that the conditions in Wisconsin were the most similar to those in Nebraska, and that that state was getting a great deal more benefit from the money expended than any of the others. The Chief of the Bureau of Roads spent two weeks studying the methods of the Wisconsin Highway Department, and the results of his investigation were explained to the county officials before any definite system of maintenance was adopted.

Before completing a maintenance system, it was necessary to consider that the state had in its possession over 200 army trucks which were available for use on state roads. This fact made it necessary that a plan for patrol maintenance of this type be recommended to counties having a large mileage to cover. Also, in some of the counties in which portions of State and Federal Aid projects were partially completed during 1919 it was advised last fall that these counties do something toward maintaining the finished portion of these projects. As at that time teams were hard to find, and the army trucks not yet available, it was recommended that the counties purchase light farm tractors with which to pull the highway maintenance equipment. Thus the three types of maintaining state roads developed and were put in operation April 1, 1920.

Comparative Analysis of Methods

Now after four months of continuous operation it is possible to make a comparative analysis of the three methods used. In making the comparison, a three-month period of operation has been taken—April, May and June. The writer has not taken into consideration the conditions of the

soils of the various roads maintained, nor the weather conditions, upon which the condition of all roads is dependent. This factor naturally enters into the costs, and either increases or lowers them, according to the existing conditions.

The following cost figures are quoted as an average, representative of the cost of the three kinds of patrol maintenance, per day, per mile, on roads which are a part of the state highway system. Attention should be called to the fact that it was necessary to buy a large part of the small equipment, as well as the machinery. Nevertheless, the counties taken show a representative amount and kind of work. It was necessary to include depreciation costs on all state-owned equipment, as well as on that owned by the county, in order to arrive at the actual cost per mile for the different types of maintenance.

AVERAGE COST OF TRACTOR PATROL APRIL, MAY, JUNE, 1920—14-MILE PATROL SECTION

Based on 5 Tractor Patrols

Total maintenance cost of five counties for three-month period, plus depreciation on equipment	\$7,532.15
Total maintenance cost of one county for three-month period, plus depreciation on equipment	1,506.43
Cost of one patrol for one month	502.14
Cost of one patrol for one day	19.31
Cost of one patrol per mile per day	1.38

TOTAL MAINTENANCE COST OF TRUCK PATROL APRIL, MAY, JUNE, 1920— 17 MILES AVERAGE PATROL SECTION

Based on 11 Truck Patrols

Total maintenance cost of 11 truck patrols for three-month period, plus depreciation on equipment—17-mile section	\$13,692.64
Total maintenance cost of one truck patrol for three-month period	1,244.79
Cost of one patrol per month	414.94
Cost of one patrol per month	15.96
Cost of one patrol per mile per day .....	.94

TOTAL MAINTENANCE COST OF TEAM PATROL APRIL, MAY, JUNE, 1920— 6 MILES AVERAGE PATROL SECTION

Based on 10 Team Patrols

Total maintenance cost of 10 team patrols for three-month period (several team patrols from one county)	\$6,493.26
Total maintenance cost of one team patrol for three months	649.32
Cost of one patrol for one month	216.44
Cost of one patrol per day per mile	8.32
Cost of one patrol per mile per day	1.38

From the figures shown above it can be seen that the average cost of maintaining one mile per day by the tractor is \$1.38. One must take into consideration, however, that this figure is based on a 14-mile patrol section; while the average cost of maintaining one mile per day by team is \$1.38, it

is based on a 6-mile patrol section. It would seem from the figures that the tractor patrol covered twice the mileage covered by the team patrol, and at the same unit rate. This is not the case, however, as the cost of the team patrol per day is \$8.32, and the section covered is 6 miles. In order to find the cost of the team patrol for 14 miles, it would be necessary to consider the same mileage. This means that the cost of $1\frac{1}{3}$ team patrols would be added to the cost of 1 team patrol in order that the mileage covered should

be 14; thus, \$11.29 added to \$8.28 will bring the cost of the team patrol for 14 miles to nearly the same figure as the tractor patrol cost for 14 miles, or \$19.41, a difference of only 10 cents. The cost of the team and tractor patrol for a 14-mile section is practically the same.

For an all-round careful patrol the team cannot be excelled, as it is much easier to stop and fix ruts, small chuck-holes and the like when driving a team than when driving a tractor or a truck. In so far as the amount of work accomplished is concerned, this factor is entirely dependent upon the care of the patrolman, for a conscientious patrolman will work diligently, doing the most careful work possible in the shortest length of time. This is one reason why the Wisconsin State Highway Department favors the team patrol. However, in Nebraska, where there is a large mileage to cover, it has been found that the truck is perhaps the most economical and the best type of patrol.

The costs quoted are, as stated before, averages based on average patrol sections. The cost per day per mile does not actually mean that one mile is gone over but once for the cost quoted, but as many times as necessary.

In considering the influence of weather and soil, it must be appreciated that the condition of the road will determine the number of times the road will have to be gone over. The figures, on face value, would indicate that the truck maintenance method is



THIS TYPE OF PATROL STATION HOUSES THE MAINTENANCE EQUIPMENT AND IS A HEADQUARTERS FOR THOSE WORKING ON STATE ROADS IN THE DISTRICT

the most desirable in all cases; however, there enters the matter of the reliability of machinery, against that of the teams. For instance, on a newly constructed grade, with deep fills, it is evident that the larger part of a patrolman's time will be spent in using the slip, if the patrol is team, while on a more level road a truck and a highway maintainer would take care of 90 per cent of the work.

There is one more thing that should be taken into consideration with regard to the cost per mile per day for the different kinds of patrol maintenance; that is, that the cost of each patrol section will materially decrease if the road is kept in first-class condition the greater part of each season. The back slopes in the cuts, especially, will soon become grass-covered, and thus will require little maintenance, as they do not wash. At the present time the new cuts have a tendency to wash, and unless there is some kind of ditch check, the slope will be worn in a short time. The patrolman should be vigilant in noting any tendency of this nature, and immediately place brush to protect the ditch washing, until such a time as he can furnish better protection.

The cost of patrol maintenance is a factor that is almost entirely under the control of the patrolman, for after the road is completed the problem of drainage and road surface belong entirely to him, and he must render the invaluable service of keeping it in first-class condition for the traveling public.

Novel Provisions of the Milwaukee Zoning Ordinance

By Arthur C. Comey

Consultant on City Planning, Cambridge, Mass.

MILWAUKEE is the third largest city in the United States to put zoning into effect. The ordinance presented by the Board of Public Land Commissioners and adopted by the City Council on November 15, 1920, combines many of the best features of ordinances in other cities, and in several respects goes a step in advance of any of them.

Relation Between Floor Space and Street Space

As the level central portion of the city was originally laid out with practically all streets 80 feet wide, thus facilitating the spreading out of the business section, the skyscraper problem could be attacked with more vigor than usual. A height limit of 125 feet, which approaches the ideal, was set for the district of tallest buildings. Compare this figure with that of any other city of 500,000 or more, or, in fact, with height limits of much smaller cities. Boston alone has as low a limit, necessitated in its case by a condition opposite to that in Milwaukee—the almost total lack of wide streets.

Towers up to 225 feet, the height limit previously in force, are permitted over one-quarter of the area of a building, but this will not materially reduce the light and air afforded nor increase the amount of traffic arising from the buildings. In fact, Milwaukee is probably the only large city which has established a relation between floor space and street space that will permit its business buildings to be served by a number of automobiles in any degree adequate for modern needs. Most cities are already faced with the utter impossibility of providing room for the operation, not to mention the storage, of even a fraction of the automobiles that would otherwise penetrate their central sections. Milwaukee, on the other hand, is perfecting its system of streets still further by projecting two great distributing arteries through its heart, one of which, 200 feet wide, is already authorized.* Its street system and its zoning pro-

visions together make acute traffic congestion a remote problem. The gain to business alone of being readily reached by automobile would well repay this far-sighted policy, while other benefits, such as increased area of high land values and relatively low cost of transportation, affect a large part of the city's life.

Ventilation and Light Throughout the City Area

The indiscriminate location of apartment houses throughout the residential districts has just begun. Milwaukee has therefore been able to step in in time and stop this tendency. Apartment houses are absolutely excluded from large sections of the city by the requirement that in the 40-foot height districts no building used in any part for residence purposes by more than one family shall be in excess of two and one-half stories, the half-story being so defined that it cannot contain an independent apartment. Note that this provision is so drawn as to avoid unnecessary restriction of one-family dwellings, which may, if desired, be built to 40 feet. With this exception, residences are everywhere limited as to stories to somewhat lower heights than other buildings in the same height district, thereby nullifying any tendency to crowd in extra stories by reducing ceiling heights to the absolute minimum the law allows.

Every room must have windows equal to one-tenth its floor area opening on a street or alley, or on a yard or court of sufficient dimensions to give a fair amount of light and air even in the most dense building districts. In most of the city, where prevailing existing conditions have not forced crowding to be permitted, yards and courts are required to be so wide that there will be a really adequate supply. Furthermore, in the "D" area districts, which comprise most of the sections recently built or now building up, these required windows must open on a street or yard of reasonable size, and there must be at least one side yard; no building shall occupy more than 30 per cent

* See THE AMERICAN CITY, August, 1920, page 135.



THE FACTORY ON THE CORNER LOT DETRACTS FROM THE VALUE OF NEIGHBORING RESIDENCES

of an interior lot; and not more than twenty families shall be housed on any one acre of land, thus producing practically garden suburb conditions. In these and similar ways this city is providing as no other yet has for openness—ventilation and light throughout its area.

No Garages on Apartment House Lots

In residential districts small private garages are permitted as accessory to dwellings, but garages of any sort are absolutely prohibited on lots with apartment houses. Prior to the passage of the zoning ordinance one building was erected which provided space for one hundred automobiles on its first floor. A convenience for dwellers in the apartment house—granted; but consider the baneful effect on surrounding property, particularly opposite it, of introducing this business on a residential street. Furthermore, once built, how can cars of others than residents of the building be kept out of it? In other words, how prevent it from becoming to all intents a public garage?

The argument in favor of a small garage on a lot with an apartment house was disposed of by the consideration that only a few of its many families could benefit by its use, while all would suffer from the undisputed element of nuisance involved in any garage. Moreover, this would in such cases be accentuated, as among other things the proximity of apartment houses would increase the noise, and the garage would usurp much of the meager play space for children and at the same time introduce a new element of danger to them.

Definite as to Details

In its details the Milwaukee zoning ordinance includes many novel provisions designed to make it more exactly effective in the work it is to do. Reference can be made to a few of these only in this article. Uniform setback provisions apply in residence districts in "C" and "D" area districts where at least one-quarter of the frontage is built up. No new buildings except those between projecting buildings are permitted to project in front of the average setback unless they leave open spaces on each side twice as wide as they are deep. This will permit shallow bays and entrance porches and reasonable use of a narrow corner lot facing an intersecting street without material injury to the open front yards established by the majority.

Accessory uses—the "no man's land" of most zoning ordinances—are much more explicitly defined so as to prevent undue development of home industries or the nuisance of rented garage space. Permission for a certain amount of manufacturing in a local business district is strictly confined to products the major portion of which are to be sold at retail to the ultimate consumer. The method of fixing the precise boundaries shown on the map, as being either the center lines of streets or lines 120 feet back from the less restricted street unless otherwise indicated by dimensions, renders dispute impossible. In fact, throughout the ordinance little is left to the discretion of the building inspector. This is as welcome to him as it is to the architects and builders or property owners operating under the code.

The zoning ordinance was prepared with the legal advice of Hon. Edward M. Bassett, of New York City, who was invited to meet with the Board of Public Land Commissioners and its consultant for detailed consideration of the tentative ordinance prior to presentation of the printed report. Mr. Bassett's addresses to the City Council, the Rotary Club and to other civic organ-

izations opened the publicity campaign, which enlisted wide support of the ordinance by the citizenship. His answers to destructive criticisms when the final draft was up in the Council helped to secure its passage practically intact. The zoning ordinance is already proving its value and promises to be of inestimable value to the Milwaukee of the future.

A Striking Message to City Officials on

THE PARALLEL PARADOXES OF THE

AND THE

"WAGE FUND"

Once upon a time a group of workmen held a meeting. Someone had a "happy thought." Said he:

"These hard times will make the amount of work to be done in this town much smaller than a year ago. So let us take it easy in our work, and thus secure jobs and wages for as many men as possible."

So the misguided conspirators cut down their hourly production. The result, of course, was an increase in unit costs to the manufacturer at a time when lower costs were needed to keep the factories going. And the "wage fund" became increasingly difficult for the employer to provide.

The workers realized too late that a wage fund can be created only by producing something that satisfies human wants, and that by redoubling their efforts they might have stimulated prosperity through a combination of lower prices, bigger sales and increasing employment. They know now—or will some day learn—that efficient work adds more to the wage fund than does the work of the slacker, and that a period of business depression is the time above all others when productive service should be rendered with the utmost vigor.

"TAX FUND"

Once upon a time a city council held a meeting. Someone had a "happy thought." Said he:

"These hard times will make taxes in this town more difficult to collect than a year ago. So let us stop new construction work of all kinds, and appropriate the tax fund only for ordinary running expenses."

So the misguided city fathers cut down their bond issues and appropriations for public works. The result, of course, was increased unemployment there and elsewhere at a time when public works would have helped to restore the demand for labor and materials. And the "tax fund" became increasingly difficult for the citizens to raise.

The officials realized too late that the amount of collectible tax money depends on the prosperity of their citizens and the municipal assets of the community, and that there is much greater economy in issuing bonds for roads or waterworks or bridges or playgrounds than in breeding privation and discontent. They know now—or will some day learn—that well-planned municipal improvements add more to realty values than they cost, and that a period of business depression is the time above all others when the building of public works should be pushed with the utmost vigor.

Courtesy of Community Leadership

The Federal Employment Service estimates that 3,473,466 fewer persons were employed in industry in the United States in January, 1921, than a year ago. If you want your city to do its share in restoring local and national prosperity, the prompt and vigorous advocacy of a constructive program of public works would help greatly.

If not wholly convinced as to the wisdom of such a policy, please tell us why. Perhaps we can help you find the answer. Reprints are available of the editorial from THE AMERICAN CITY for December, 1920, on "Public Works as Panic Prevention," if you want them.

Modern Cast Iron Pipe

By A. F. Macallum

Commissioner of Work, Ottawa, Can.

WHILE cast iron pipe has been in use in France at Versailles for over 150 years, its use in America did not commence until about 1817. In that year cast iron pipe was laid in Philadelphia as an experiment, which was so successful that it has been almost exclusively used for water-mains, and more recently for gas-mains, since that date. It is a factor of great magnitude not only in the development of modern water-supply projects, but in the broadening of many industries.

While many attempts have been made to introduce varieties, the bell-and-spigot joint has been for over a century, and is yet, the standard joint, and because of its long use may be regarded as having proved its inherent merit of design. Flanged pipe, although made for the first installations, was found too rigid for underground lines, besides being more expensive, and is now used only for special purposes.

Cast iron pipe was generally cast on its side, but because of its tendency to be "out of round" or of uneven thickness, thus giving a pipe easily broken and unreliable, this method of casting was abandoned and the pipe was cast vertically in molds. This vertical casting of pipe gave very satisfactory results, although the pipe was still subject to blow-holes.

The New Method

The present specifications for cast iron pipe are based on iron having a tensile strength of 20,000 pounds. When higher standards are given under the present foundry methods and mixtures, the pipe is apt to be more brittle. On account, however, of new methods being adopted in the method of manufacturing iron pipe, consideration is now being given to the revision of the specifications to meet these new conditions. This new method, developed by DeLavaud, a French engineer, is now being used in this country after being subjected to tests in comparison with the ordinary standard cast iron pipe, by Professor Peter Gillespie of the Department of Applied Science, Toronto University.

The process of manufacturing this new

type of cast iron pipe involves the application of the principle of centrifugal force to molten metal at a high temperature (about 1,800 degrees F.) in a permanent revolving mold. A regulated quantity of this cast iron is introduced into a revolving water-cooled cylinder where, by the centrifugal force exerted, the molten metal is spread uniformly upon the surface of the mold. Within a minute the pipe is withdrawn from the mold at a white heat. The pipe is brittle after leaving the mold, on account of the outer surface being chilled, but after passing through an annealing furnace it becomes tough and much stronger than ordinary cast iron pipe, as shown by the tests made by Professor Gillespie.

The pipe made under these conditions has a decided contrast in structure to pipe cast in sand molds, where the casting is much slower and has not the segregation of impurities often found in the sand cast pipe. As a consequence, the pipe is a homogenous, dense, fine-grained iron throughout, having no water or gas bubbles, and because of this density and strength the pipe can be made much thinner.

In tests made by Professor Gillespie a 6-inch pipe made by this machine was compared with a 6-inch Class C, ordinary sand-molded pipe, and out of the same iron, with the following results:

CENTRIFUGAL CAST PIPE		
Thickness .....	.28 inches	
Tensile strength	37,000 lbs. per sq. in.	
Modulus of elasticity	14,500,000	
Modulus of rupture	63,800	
Quality factor	20.2	

SAND CAST PIPE		
Thickness .....	.51 inches	
Tensile strength	16,000 lbs. per sq. in.	
Modulus of elasticity	8,860,000	
Modulus of rupture	33,900	
Quality factor	9.8	

From which it will be seen that the centrifugal pipe has a very high tensile cross-bending and resistance to shock values.

As found by these tests, the ratios of these to other coefficients similarly found for the sand-mold pipe from the same iron are as two to one, or twice as strong.

In the tests for corrosion made by Professor Gillespie he found no difference, but in tests made at Sao Paulo, Brazil, it was

found that the centrifugal cast pipe showed much better results than the sand-molded pipe.

In soils such as found in Ontario, it has been found that ordinary cast iron pipe has very little corrosion. The writer has removed a section of old English cast iron pipe laid in 1859 in Hamilton that showed no corrosion whatever, after being in the ground over 50 years, having even the weight marks clearly legible. This old English pipe was made much thinner than called for in the present-day specifications, and being on a rising main is still in service under more severe conditions from pressure than when laid. This centrifugal cast iron pipe has a smooth exterior and internal surface, and besides reducing hydraulic frictional losses, takes a much better surface coating.

It has been found that it machines

easily, and because of the method of manufacture the wall thickness is practically exactly uniform.

Because of its double strength the centrifugal cast pipe can successfully be made considerably thinner than the sand cast pipe, and as a consequence a 12-foot pipe 6 inches in diameter will weigh only 240 pounds, compared with 430 pounds for a sand cast pipe of the same diameter, with the consequent saving in freight rates on shipments of the same quantity of pipe.

This light weight of the centrifugal cast iron pipe facilitates its laying, as a greater number can be calked on the ground and lowered into the trench. Besides, this latest development in the manufacture of iron pipe brings it into competition with steel pipe under conditions that had practically limited the field to steel pipe, and indicates an advance on previous methods.

Designing Roads from a Traffic Census or from Common Sense

Highway traffic is, of course, the first factor to be seriously considered in connection with pavement economics. Traffic is the thing which makes highway surfacings worth while, and the thing which wears them out. Its amount and its characteristics are important and should always be taken into account.

In a paper entitled "Relative Service Value of Pavement Types," A. R. Hirst, State Highway Engineer of Wisconsin, has offered some ideas to the Association of State Highway Officials which are worth serious consideration by all designing and constructing engineers:

"A preliminary traffic census is absolutely valueless in helping to determine the type of surfacing to be used. An inspection of the location of a road on the map, a knowledge of its relation to other roads and to the general highway system, and to business centers, together with a consideration of the business tributary to it and probably to be tributary to it, will tell a highway engineer who knows his business whether the construction in question should be first, second or third class. The traffic on a road last year or last month has absolutely no value in this connection, because when a highway becomes part of a superior highway system, or when one highway is paved

with a surface superior to that on the adjacent and competing highways, traffic is so concentrated on that highway that what has been is no indication of what will be.

"Any assumption of what traffic will be is merely an assumption, and the presence on a certain past day of one hundred automobiles, ten trucks, eight farmers or their wives in single buggies, and three babies in their perambulators has really no bearing on the future situation.

"Traffic counts have value only as serving to give accurate information as to the constantly occurring changes in traffic conditions, and in determining the relative cost of services per unit given by various pavements. The unit cost per ton of carrying traffic is the important consideration, and, unfortunately, we have little or no information on this point.

"The fact that this type of pavement was maintained for so much per annum and that type for so much per annum, means little unless we know the amount and weight of the traffic served and that it was served adequately. Even then the information would not be conclusive, because the pavement which gave this unit cost under the prevailing soil and climatic conditions might give an entirely different unit cost under different soil and climatic conditions.

The Effect of Different Waters on Mains

With Interesting Results of Tests Before and After Cleaning

By J. E. Gibson

Engineer and Manager, Water Department, Charleston, S. C.

IN 1879, the City Council of Charleston granted to Jesse W. Starr, Jr., of Camden, N. J., a franchise for a public water-supply. This franchise provided for a supply of water to be obtained from artesian wells, and the laying of some twelve miles of cast iron pipe. These mains were located on the principal streets and the water-fronts of the Cooper and Ashley Rivers. They were for the most part 6-inch cast iron mains, but the mains on Broad, Meeting, King and Wentworth Streets were 8-, 10- and 12-inch diameter respectively, as they were feeder mains from the plant on George Street.

Water was first turned into the mains in 1880 and came from the artesian wells located at Wentworth and Meeting Streets and the Citadel Square. The artesian water was very soft, containing only 30 or 40 parts per million of hardness, but the total solids ran from 1,800 to 2,000 parts. It was highly prized for drinking and bathing purposes, but could not be used for cooking or manufacturing purposes on account of its high soda content. All starchy foods were turned a brownish green, and when the water was used in boilers a violent foaming ensued. This water had a temperature of 90 degrees F., and rapidly incrusts the pipe wherever the protective coating was defective.

From time to time additional artesian wells were put down. The normal yield from these wells was approximately 1,000,000 gallons per day, which was later increased by the use of the Pohle air lift to 2,000,000 gallons per day. The growth of the city was such that this supply soon became inadequate and it was not possible to furnish a full normal pressure throughout the twenty-four hours of the day.

In 1902 new capital was sought and a new franchise was granted for a water-supply to be obtained from a surface stream. The new water company took over the plant of the old water company and developed a supply of water from Goose Creek, the new

pumping station being located about twelve miles north of the city limits.

Goose Creek is a tidal estuary of the Cooper River, having a total drainage area of 60 square miles at its junction with the Cooper River. The stream is very tortuous and is bordered alternately by wide, treeless marshes covered with a dense growth of salt-growing vegetation. At the site selected for the pumping station an earthen dam was thrown across the creek, and the tide-water was prevented from flowing upstream. The water above the dam was allowed to freshen because of rainfall and inflow, and this now forms the supply of water for the city of Charleston. The total drainage area above the dam is $42\frac{1}{2}$ square miles, and the storage reservoir covers an area of $3\frac{1}{2}$ square miles. The amount of water stored at the flow line elevation of the dam (10½ feet above low tide) is 2,780,000,000 gallons, and the average depth of the water is approximately 6 feet.

The drainage area is low-lying and generally covered with pine, cypress and kindred trees, and, in common with coastal waters from Maine to Texas, is highly colored with the vegetable organic matter of the swamps. The alkalinity usually runs from 10 to 15 p. p. m., and the color anywhere from 100 to 250, depending upon conditions of rainfall, vegetation, etc.

The water is filtered through gravity mechanical filters, the coagulant used being sulphate of alumina. To satisfactorily remove the color from water it has been found necessary to bring the water to practically a neutral or acid condition, and that is done in the treatment of the Goose Creek supply. The color is removed from a normal of, say, 180 to about 25 p. p. m., and in so doing the alkalinity is reduced from an average of 12 to about 2 p. p. m., below which point it is not deemed advisable to go. After filtration there is sufficient lime, in the form of lime water, added to the filtrate to restore the alkalinity to about 18 p. p. m., and to reduce the carbon dioxide

content of the filtered water to form 2 to 3 p. p. m. The total solids, after treatment, average about 70 to 100.

This water was first introduced into the city mains in the fall of 1903, and, because sufficient time had not elapsed for the dilution of the salt in the flooded marshes, or for the reduction of color due to the heavy vegetable stain, it was not anywhere near the present quality.

It will be noted, therefore, that artesian water was supplied from 1880 to the winter of 1903, and since that date Goose Creek water has been supplied through the mains. No change has been made in the piping system during all these years except to take care of the natural growth of the city.

On October 1, 1917, the city by purchase took over the plant of the private company, since which time it has been operated as a municipal corporation. The increasing values of real estate and storage warehouses along the river fronts demanded increased fire protection, and in the fall of 1918 the Commissioners of Public Works, who operated the plant for the city, authorized the department to lay reinforcing mains along the river fronts in the congested districts.

Cleaning the Mains

At the same time it was deemed advisable to clean the existing mains, and a contract was made with the National Water Main Cleaning Company for the use of one of its cleaning machines. In all, some six miles of mains were cleaned, the work extending over a period of about six months. The writer believes the method of cleaning water-mains is pretty generally understood, yet a short description may not be amiss.

The stretch of main to be cleaned was first opened up at two points, usually from 400 to 600 feet apart. A small carrier, made up of three cup leathers (similar to those used in a hand bilge pump) fastened together by flexible connections, were attached to a small cable ($\frac{1}{4}$ -inch diameter) and introduced in the main at one of the openings. The ends of the mains were plugged by means of wooden plugs, with a 2-inch pipe connecting the two plugs, the small cable passing through a small hole in the side of the plug. Water was then admitted through the plugs and the connecting 2-inch pipe to the rear of the cup leather carrier, which was forced through the main,

pulling the cable with it. As soon as the cable appeared at the second opening, the pressure was shut off, the carrier removed and the small cable made fast to the large cable (about $\frac{5}{8}$ -inch diameter), which was then pulled backward through the main to the first opening or point of introduction of the carrier. The wooden plugs were removed and the large cable made fast to the cleaning machine proper, which was then placed in the main and the opening closed up with a piece of cast iron pipe and sleeve joints.

The cleaning machine proper consisted of a number of blades, similar to an ordinary boiler flue scraper, the blades being set in three or four groups and spaced around the circle so that the entire circumference of the pipe was covered. The blades of the cleaning machine were made of tempered steel and set out slightly larger in diameter than the diameter of the pipe. Sometimes the leading or forward blades on the machine are made saw-tooth; the rear blades are always perfectly plain. On all of the work done at Charleston plain blades were used, as we wanted to preserve the coating of the pipe if possible. We found, however, that practically all of the coating had been destroyed, probably by time. As soon as the opening in the main was closed, scraping was begun by attaching the opposite end of the cable to a heavy winch which could be turned by two men each, on opposite cranks. At the same time, water was turned into the main from the rear of the cleaner so that all material scraped from the sides of the main was washed forward and out of the main at the opening. Usually it required about eight hours to cut in and clean 600 feet of main. This time does not include the time of digging the openings in the streets, but it does include the time of cutting the main and replacing the sections cut out.

Carrying Capacity of Mains

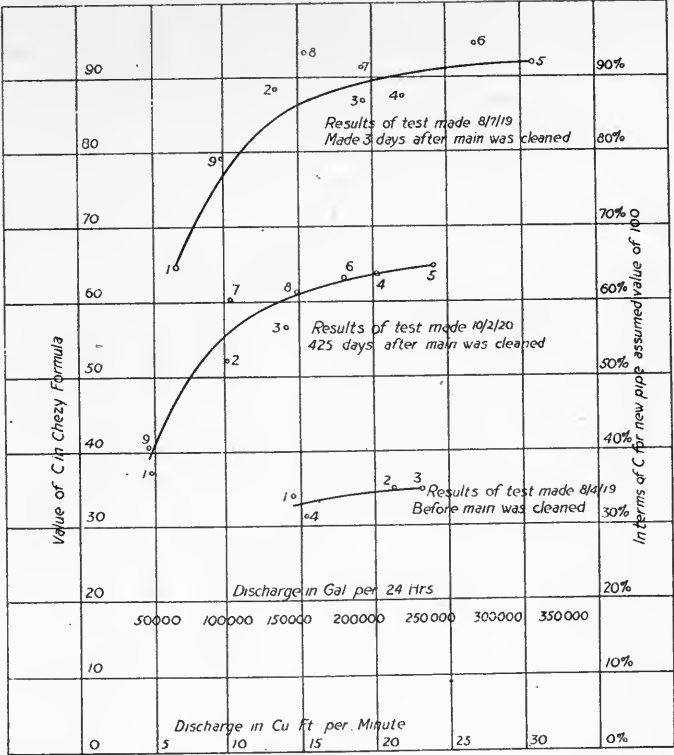
It was not possible, on account of other work being carried on at the same time, to test all the mains for carrying capacity before and after cleaning, but one complete test was made on what was considered a typical case. The main tested was located on Legare Street between Lamboll and Tradd Streets, a total distance of 755½ feet. This main was laid in 1880

and had never been cleaned.

There were three hydrants located on this main, two 755½ feet apart, and the third 300 feet further. The third hydrant was connected by means of pipe to a 2-inch Trident Crest meter, the first and second hydrants were connected by means of a ¾-inch galvanized pipe and U-tube filled with mercury, and all other valves and supplies were cut off, except the one at the Tradd Street end. It will be seen, therefore, that by opening the third hydrant a flow was created in the length of pipe and the friction loss between the first and second hydrants could be noted from the U-tube, and the quantity of water passing through the main would be measured by the 2-inch Trident meter. There

were three sets of tests made: (1) before cleaning; (2) immediately after cleaning; and (3) fourteen months after cleaning. On account of the third hydrant's having a loose seat on the stem, it was not possible to make the first series of tests to cover the low rate of flow, as this loose seat acted as a ram, causing water-hammer in the main.

The values of coefficient "C" in Chezy's Formula, $V = C \sqrt{RS}$, was determined, and these values are given in the accompanying diagram. It will be noted that each test consisted of two series, that is, increasing and decreasing velocities. The result of each test as plotted represents ten individual observations, and the curves shown have been drawn by inspection. The rates of discharge are given in cubic feet per minute and in gallons per twenty-four hours. On the right hand of the graph, the results are shown in per cent on the assumed value of C of 100 for new cast-iron pipe. This is not absolutely correct, as authorities vary, giving the value of C as low as 95 for low velocities and 110 for high velocities, but nevertheless the



RESULTS OF TESTS OF MAIN BEFORE AND AFTER CLEANING

figures are comparable. It will be seen that for the 40-year pipe the value of C had fallen to 34, and immediately after cleaning, this coefficient was increased to about 90, and that within a period of fourteen months it had again deteriorated until the value was about 61.

This was rather disappointing to the writer, although he had been somewhat prepared from a previous experience on the 24-inch supply main leading to the city. These former tests indicated that it is reasonable to expect a main that has been once cleaned to deteriorate more rapidly than new main, because in scraping the tubercles from the mains the protective coating is more or less destroyed, and there is left a rough and pitted surface which offers a maximum condition for rust and corrosion. This may be further aggravated should the water contain vegetable or other acids, which would set up differences of polarity between the adjacent parts of the pipe.

Goose Creek water is maintained at about 18 parts of alkalinity, which is certainly

positively alkaline, but there is a possibility that all waters (particularly along the coastal plain) contain acids that attack metals. We learn by experience, and it has been found that if the Goose Creek water is maintained at an alkalinity of from 12 to 15 p. p. m., little trouble is experienced due to red water or corrosion in the hot water pipes of house boilers, but below this point considerable trouble is experienced.

It has been noted by the writer that the amount of the corrosion or tubercles does not so much reduce the carrying capacity of the main as the nature of the internal surface of the pipe.

In 1915, 11 miles of the 24-inch cast-iron main delivering water into the city were cleaned, and within a period of three months after cleaning, the friction loss had substantially increased to that before cleaning, and it was again determined to clean this main. The actual cleaning, however, did not take place until about twelve months after the first cleaning.

Results of First and Second Cleanings

Before the first cleaning, judging from pieces of pipe that were removed to insert the cleaning machine, it was found that the internal surface of the main was covered with large tubercles, projecting as much as $\frac{1}{2}$ to $\frac{3}{4}$ of an inch, and having a diameter of $1\frac{1}{2}$ inches or more. They were fairly close together, and the entire surface showed a tuberculated condition.

At the second cleaning of the main, some of the pipe formerly cleaned was removed,

and it was found that the inner surface was covered with innumerable tubercles, having a diameter of about $\frac{1}{4}$ -inch and projecting about $\frac{1}{4}$ -inch. They were much more numerous than in the first cleaning and looked as if someone had taken a pepper-shaker and peppered the entire surface of the main. The friction loss before the second cleaning was about the same as that with the larger tubercles. The protective coating had been more or less destroyed by the first cleaning, and the condition of the water pumped through the main undoubtedly promoted the growth of the tubercles. After the first cleaning and for a period of sixty days the water pumped through the main had an alkalinity of less than 5 p. p. m., using the erythrosine method.

It is known that this method for determining alkalinity is not delicate to within 3 or 4 p. p. m., and, undoubtedly, at times the water was acid and had a high carbonic acid content all of the time.

After the second cleaning the water was carried exceptionally high in alkalinity, with the hope that a deposit of calcium sulphate might be obtained on the main. This does not seem to have taken place, although the carrying capacity of the main had not deteriorated nearly so rapidly as after the first cleaning.

Since the above main was cleaned, an additional main has been laid for some 30,000 feet, duplicating the 24-inch main, and it is hoped that in the near future, friction losses can be obtained for the 30,000 feet of old 24-inch main, using the new parallel main as a piezometric pipe.

On the Calendar of Conventions

FEBRUARY 14-20.—NEW YORK CITY.

National Civic Federation. Annual meeting. Secretary, D. L. Cease, 1 Madison Avenue, New York, N. Y.

FEBRUARY 17-19.—PORT HURON, MICH.

Michigan Commercial Secretaries' Association. Semi-annual meeting. Secretary, C. W. Otto, Board of Commerce, Pontiac, Mich.

FEBRUARY 24-25.—ELLENSBURG, WASH.

Washington Association of Commercial Organization Secretaries. Semi-annual meeting. Secretary, A. F. Marsh, Chehalis, Wash.

FEBRUARY 25-26.—HARRISBURG, PA.

Pennsylvania Commercial Secretaries' Association. Semi-annual convention. Secretary, E. J. Fellow, Chamber of Commerce, Lebanon, Pa.

FEBRUARY 26-MARCH 3.—ATLANTIC CITY, N. J.

National Education Association—Department of Superintendence. Annual meeting. Secretary, Miss Charles O. Williams, Superintendent of Schools, Memphis, Tenn.

FEBRUARY 26-MARCH 3.—ATLANTIC CITY, N. J.

National Community Center Association. Annual meeting. Secretary, Eugene C. Gibney, 70 Fifth Avenue, New York, N. Y.

MARCH 9-11.—REGINA, SASK.

Saskatchewan Association of Rural Municipalities. Annual convention. Secretary, E. G. Hingley, Farmers' Building, Regina, Sask.

APRIL 27-29.—ATLANTIC CITY, N. J.

Chamber of Commerce of the United States of America. Annual meeting. Secretary, Elliot H. Goodwin, Riggs Building, Washington, D. C.

An All-Season Playground

Asphalt Paved Tennis Courts Used for Skating Rinks in Winter in Gary, Ind.

IN order that a tennis court or playground may be termed an all-year investment, some provision must be made to use the area for winter sports.

A close study of the situation when the courts in Gary were built led the officials to decide to lay a smooth sheet asphalt wearing surface which would give an excellent tennis court in warm weather and which could withstand the damaging effects of a surface of ice for skating purposes in winter. The playing surface was laid as follows: First the plot was excavated so as to allow for the laying of the base and the sheet asphalt wearing surface. Then a curb of concrete 6 inches wide and 16 inches deep was laid around the entire lot. Drains were constructed and pipes placed at the back of the court to hold the wire for the back-stops, and then tennis-net supports were set. After this, a layer of stone ranging in size from 1 to 2½ inches was spread over the entire surface, in such quantities as to provide a depth of 5 inches after it had been rolled and consolidated. Texaco asphalt paving cement was then spread over the

broken stone by means of hand-pouring pots, using about 1½ gallons per square yard. This was covered lightly with clean stone chips free from dust, and then the entire area was compacted with a 5-ton roller. Just enough stone chips were then applied so that upon rolling they were forced into the surface voids of the asphalt-coated stone, leaving no excess of asphalt on the surface. The next step was to lay a binder course 1 inch in depth, and then a 1-inch sheet asphalt wearing surface, laid in the usual manner.

These courts were constructed during the summer of 1919 and used as a skating rink last winter. The curb was allowed to extend about 3 inches above the asphaltic surface, and during the winter the drainage inlets were plugged and the courts were flooded with water. Upon freezing, they furnished an excellent skating rink. The contractors for this work were the Municipal Contracting & Supply Company, Gary, Ind. The accompanying illustration shows the court in summer being used as a playground.



Photographs courtesy The Texas Company

IN WINTER THIS SHEET ASPHALT TENNIS COURT IS FLOODED TO MAKE AN IDEAL SKATING RINK

The Maintenance of Brick Pavements

By Oscar F. Weissgerber

City Engineer, Appleton, Wis.

IN many cities there are brick pavements in which the brick have worn down on the edges and become like small cobblestones, causing a great deal of noise, and inconvenience to business places and to the public at large. The annoyance is especially great when solid-tired vehicles, such as drays or other horse-drawn wagons clatter over the streets. Cities that have had this experience will be interested in a piece of work recently completed in Appleton, Wis.

The work was done on College Avenue and on one block of Washington Street, where brick pavements were laid in 1908. The pavement on College Avenue was a Purington brick, the best in the market in those days, and, in fact, a good brick to-day. On Washington Street the brick used was softer and inferior to the Purington. There were places where the joints were worn down between the bricks from $\frac{1}{2}$ to $1\frac{1}{4}$ inches from the original surface, thus presenting a very rough, corrugated surface. On both streets an asphalt filler was used that had been recommended on account of not being noisy. For awhile that was the case, but as the asphalt wore down, being gouged out by horseshoes, etc., it left the edges of the brick unprotected, with the result as stated above.

Numerous suggestions were made about turning the brick over, but the expense involved was considerable. There were 29,054 square yards, and the lowest estimate, of \$1 per yard for turning and cleaning, did not include the cost of new brick to replace any that might be broken. Information was asked for from several cities, but none of them had any data as to expense for similar work. In August, 1919, the writer tried an experiment with about 200 square yards of the roughest piece of pavement, where the travel was the heaviest, with such good results that the Mayor and Council authorized the expense of the whole work. This has now been completed, and the benefit derived is more than was expected.

Before the improvement, the pavement, besides being noisy, was unsanitary. Although we flushed our streets twice a week, and oftener if necessary, between periods of

flushing the refuse would get in the crevices and dry, and finally blow around. To-day the street is smooth, is much more easily kept clean, and the cost of cleaning has been materially reduced.

Method of Surfacing Worn Pavement

The pavement was thoroughly flushed and cleaned with the ordinary street flushers. After flushing, a crew of men went over the surface with brooms and small hooks to get all the dirt between the joints that the flushers would not take out. A horse-drawn street broom was used to remove the heavy material accumulated by the flushers in the gutters, where it was picked up and hauled away.

After the pavement was thoroughly dry, another crew of men spread a coating of Tarvia "A" on the surface of the brick, leaving it about $\frac{1}{4}$ -inch thick. This material was heated in a kettle holding about four barrels, but there were never more than three in it at one time, on account of danger of overheating and fire.

The binder was heated to the point where it would run freely from the faucet, or to a temperature of about 225 degrees F., and then carried in buckets to men who used ordinary floor squeegees with a rubber edge, similar to those used in drying floors after scrubbing. The material was spread evenly, and then a coating of pea or roofing gravel was spread to a depth of about $\frac{1}{2}$ -inch.

After the gravel was applied, a 10-ton roller was run over the surface. The roller forced the gravel into the binder in the joints between the brick, and the gravel that lay on the surface of the brick was generally crushed into several smaller pieces. After rolling was completed, the street was immediately opened for traffic.

This work should be done on a warm day, not on a hot one, as the brick get hot in the sun, and the material has a tendency to run to the gutter if too warm. It should be covered immediately to prevent its doing so.

The best results were obtained with pea gravel, although some limestone screenings were used and also coarse Janesville sand.



APPLYING BITUMINOUS SURFACING TO OLD BRICK PAVEMENT
 Photograph shows heating, pouring and squeegeeing of binder in August, 1920

Unless the screenings are hard and tough, they should not be considered. The entire yardage was completed in ten days, which included the cleaning, applying binder rolling, etc. The entire cost of the work was as follows:

267 bbls. Tarvia "A" @ \$8.313.....	\$2,219.57
Freight	119.72
Labor and teaming, including unloading and distributing material.....	1,454.01
Supplies, tools, etc.	67.23
Gravel, screenings and sand.....	740.24
	<hr/> \$4,600.77

With 29,054 square yards covered at this amount, the unit cost per square yard amounts to 15.8 cents. Comparing this with the turning of the brick as mentioned in the first part of this article, it will readily be seen that the saving is considerable.

For estimates for similar work for any city that contemplates using this method, the following may be taken as an average:

1 barrel Tarvia, average of 50 gallons covered 108.8 square yards, about $\frac{1}{2}$ gallon to the yard
 302 cubic yards of sand, gravel and screenings used, or one cubic yard covered 96.5 square yards
 Labor was paid from 41 to 45 cents per hour
 Foreman at \$5.00 per day and teams at 90 cents per hour
 Engineer and roller \$5.00 per day
 Pea gravel cost \$2.60 per ton, f.o.b. Appleton

Supplies consisted of gasoline for roller, wood for tar kettle, and scrapers and brooms for workmen

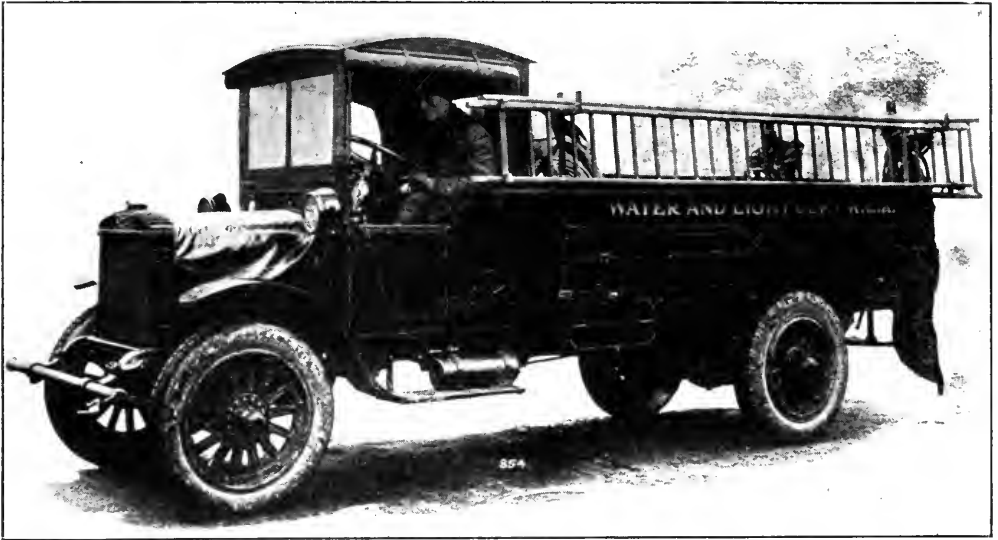
The pavements treated, in the writer's estimation, will wear for several years with the single coat, although it is recommended that another coat be put on next season.

In all cases where similar work of this kind is contemplated, the writer would recommend the double mat coat treatment—that is, a second coat of Tarvia "A" and gravel—applied in about 30 days after the first treatment is applied, or just as soon as the first coat has thoroughly ironed out.

The second coat would not be nearly as expensive as the first, as the cleaning of the crevices in the pavement would be eliminated. Neither would as much binder be used, and with these additional coats a mat would be obtained the care of which would be only in proportion to the amount of travel.

The City Council has decided to treat another street where conditions are similar and where a recent count of traffic showed 400 vehicles in $1\frac{1}{4}$ hours. This street is one of the entrances to the city and carries all the heavy dairying and trucking to neighboring cities.

Versatility Characterizes Municipal Motor Trucks



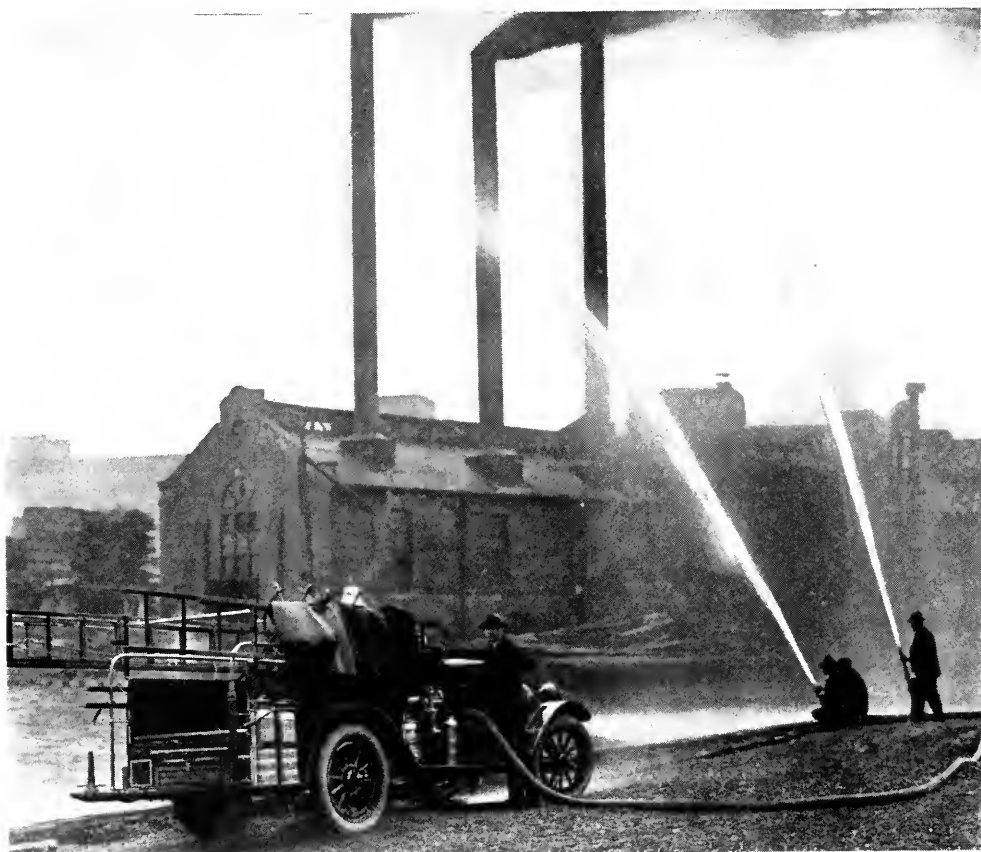
A SERVICE MOTOR TRUCK OWNED BY THE KANSAS CITY, KANS., LIGHT AND WATER DEPARTMENT



PART OF ONONDAGA COUNTY'S FLEET OF 19 WHITE TRUCKS HAULING STONE FROM THE JAMESVILLE QUARRIES



A GMC CHEMICAL AND SERVICE TRUCK IN USE BY THE CITY OF PUTNAM, CONN.



TESTING A REO FIRE TRUCK FOR CAPACITY AND PRESSURE

Snow Removal in American Cities

Clear Streets in Winter Essential to Municipal and Business Transportation

THE importance of keeping at least the main municipal arteries of travel free from snow is growing rapidly, as a result of the increasing use of the motor vehicle for municipal and business purposes. The solution of the snow removal problem in cities is therefore of prime importance. In order to make available to municipal officials complete and up-to-date information on snow removal methods in American cities, the kind of apparatus now used, and the suggestions and opinions of experts and others who have studied the subject, the New York State Bureau of Municipal Information has sought reports from American cities, a summary of which THE AMERICAN CITY takes pleasure in printing below.

Methods of Attack

There are three distinct methods of attacking the snow problem:

1. Clearing streets for traffic
2. Snow removal
3. Snow fighting

Until recent years, the custom in all cities was to wait until the storm ceased before beginning snow removal. Several cities now recognize the efficacy of beginning work while the snow is falling. These cities have a snow alarm which sounds whenever indications point to a heavy fall of snow, or when a certain amount has fallen. Efficient snow-fighting methods involve three things:

1. Preparedness
2. Organization
3. Equipment

The consensus of opinion is that, wherever possible, effective machinery should be used, thereby reducing dependence on labor to a minimum. It is pointed out, however, that care should be exercised in investments for equipment; machinery used exclusively for snow fighting is idle so much of the time that every effort should be made to use whatever available city apparatus can be temporarily converted into use for snow fighting. In the spring, summer and fall, this apparatus should be available for other municipal services.

How Some American Cities Remove Snow

Albany, N. Y.—On wide streets, motor trucks are used, with hand loading, while on narrow streets hand-loaded teams are used. On wide streets having large sewers with good flow of water, horse-drawn snow scrapers carry the snow to sewer manholes. Horse-drawn road graders are used to open streets in outlying sections. The operation is as efficient as could be expected without special snow-removal equipment.

Amsterdam, N. Y.—On streets with trolley tracks snow removal is accomplished by the traction company and city forces cooperating. On residential streets, a heavy snow-plow drawn by horses is used, and six miles of streets are opened wide enough for one-way traffic.

Binghamton, N. Y.—Hand shoveling to dump-wagons and trucks with hoists, and disposal of snow through manholes in floors of bridges over the Chenango River, are used in this city. Snow is first removed from the zones established on the principal business streets for passengers getting on and off street cars, and then the work is extended throughout the city. Snow-plows are used on streets where there are no trolley tracks and where there is a considerable amount of traffic.

Buffalo, N. Y.—Plows attached to tractors perform satisfactorily, and ordinary plows are used to furrow the snow toward the gutters. In the business sections the furrows are picked up by snow removers of a capacity of approximately $2\frac{1}{2}$ cubic yards. The cost of removing this snow was 7 cents per cubic yard in 1919-20. The snow was dumped into manholes over two large 8-foot sewers. Snow-fences were used on the outskirts, and a tractor plow to move the snow into the gutters on residential streets. Exceedingly high drifts up to 15 feet could not be handled by any machinery available and had to be attacked by hand labor.

Corning, N. Y.—Snow was removed last winter at a cost of 31 cents per cubic yard by team-drawn scrapers, loaded into sleighs and carted to the river bank, where it was deposited. It is planned to use a motor truck with snow blade scraper in front and a dump rigging and dump trailer attached which will probably cut the cost of snow removal in half.

Geneva, N. Y.—Snow is carted away in the business sections and packed in the residential sections.

Jamestown, N. Y.—Hand labor and horse-drawn wagons were used last year to remove the snow, which is dumped into the river. This proved a very slow method. Outside men owning horses are employed and paid according to the length of the route covered and the difficulties encountered. For cleaning sidewalks the city is divided into 32 routes. When it snows during the late afternoon or night, the police department calls the snow-plow men on the phone, usually about 3 A. M., and between the hours of 6 A. M. and 6 P. M. the calls are made by the Superintendent of Streets. There are 100 miles of streets, so that the men cover about 200 miles. They are usually through by the time pedestrians appear, between 6 and 6:30 A. M. The system works well and obviates the necessity of wading through drifts, as the early workers and school children would have to if the sidewalks were cleared by individual property owners.

New York City.—The organization for snow work in New York City is divided into three classes: (1) snow fighting, to be composed of the department force and equipment augmented by hired laborers; (2) the contractors' forces for the removal of snow after the storm ceases; (3) street railway forces, which are under the direction of the street railway companies, consigned to the streets which they are obliged to clear of snow under the terms of their contract with the city and their respective franchises. In the plan of co-operation between the Street Cleaning, Fire and Police Departments, two policemen and two firemen who are licensed chauffeurs are assigned to operate Caterpillar tractors. The general plan of operating the tractors together with the 5-ton auto trucks of the Department is as follows:

As soon as a snowfall starts and it is believed there will be a continued storm, orders are issued to have the tractors and trucks begin work. The plows are attached to the trucks at various angles, and the police, here and street cleaning operators who are assigned to this work are called to report immediately for duty and to proceed at once to the points they are to plow. The plows in teams of two clean a width of 20 feet of roadway for a distance of 3 lineal miles in one hour, and continue working over such a route after the snow has ceased falling. The average rate of snowfall is $\frac{1}{2}$ -inch per hour, and the motor-driven plows, operating at a speed of 3 miles an hour, can cover the entire area every two hours, constantly plowing one inch of snow on each trip up and down the assigned area.

With 150 tractors and 250 5-ton trucks operating, all of which have snow-plows attached, starting at 200 different points and covering 3 lineal miles, cleaning 20 feet of roadway, the Department plows at the cessation of each snowfall 600 miles of roadway in the important sections of the city; 70 per cent of this is in the borough of Manhattan, so that there is no such interruption of traffic as practically paralyzed the trucking business last year and caused the loss of millions of dollars.

This work is alternated with the use of hired motor trucks to which Department snow-plows are attached. About 100 of these are engaged in work in the same manner as the Department trucks and tractors, covering an additional 150 miles of roadway. This total force operates within one hour after the call has been issued by the Commissioner, so that if the storm is in progress one hour and it is decided to call out the forces, all of the equipment is in motion within two hours after the storm starts; in other words, the full force of motor trucks and tractors is operating when the snow reaches the depth of one inch.

The first point in the work of snow removal is to keep the traffic moving. This is accomplished by throwing the snow from the center to the sides of the roadway. The second point is to have the snow removed as quickly as possible after it is thrown to the sides. For this purpose 100 2-ton Department trucks and the Department force of carts, 500 in number, are utilized on the first day of each storm, to haul the snow to the most convenient disposal points, such as sewers and water-front dumps. During the progress of the storm the laborers are assigned to work at the same time as the call is issued for the plow to start out, and they pile the snow just as soon as it is thrown to the side of the road by the plows. This obviates delays while waiting for the contractor's forces to begin work, which is usually the following day.

After they stop plowing, the plows attached to the tractors are used to remove snow from the roadways to the sewer manholes, which means that 150 tractors are busy pushing snow on all streets where sewers are available, and in this way great quantities of snow are removed quickly.

Emergency men have been registered in order to have an available snow-fighting force of laborers ready to report at the 103 section stations throughout the three boroughs, at which places they are equipped with picks, shovels and pan scrapers, and under the direction of squad leaders they are assigned to certain routes for sewerage or piling the snow, depending upon the type of sewer adjacent to the various points at which they are assigned to work. The rates of pay to attract a sufficient number of laborers for snow work are determined from time to time upon a survey of labor conditions.

Schenectady, N. Y.—Ten-ton Holt Caterpillar tractors were secured from the Government warehouse in Schenectady in 1919-20 and were used to push a 13-foot and a 16-foot triangular snow-plow, opening up the important arteries of traffic quite rapidly and effectively.

Sherill, N. Y.—The roads were opened up for automobiles with a 16-foot snow-plow drawn by six horses. A heavier snow-plow mounted on a tractor will be used this winter.

Cambridge, Mass.—Horse-drawn levelers are used to break down drift piles on the side streets after the householders have had sufficient time to clear the sidewalks. Following this, gutter plows are used to open up the gutters to prevent flooding during a thaw.

Chicago, Ill.—The equipment consists of 35 snow-plows which can be attached to 5-ton trucks. These plows are used to open up the business streets to traffic. Men and trucks are hired to pile and cart all the snow to the dumps. A permanent special snow organization is maintained, consisting of a specially

trained group of street bureau employees assigned to a snow squad.

Cincinnati, Ohio—Regular organized snow gangs are maintained, to report at specified places under the leadership of their district foremen. Work is started at the center of the city and branched out from there, gathering the snow and dumping it in special sewers wherein are installed flush valves to run the snow through the sewer. These flush valves are maintained only in the center of the city. In the suburban districts the main transfer points are cleared, so as to inconvenience street car traffic as little as possible. Tractor plows and motor trucks are used to facilitate work.

Dayton, Ohio—Baker auto snow-plows attached to $5\frac{1}{2}$ -ton trucks are used, and snow is hauled away by teams and trucks.

Indianapolis, Ind.—Snow is removed by the efficient service of the street railway company, and no fall has yet been heavy enough to prevent the company from clearing its tracks. The city removes all snow from the streets, including that which the street car company throws from its tracks. No special equipment is used; the old hand shovel is supplemented at times by home-made plows drawn by horses.

Milwaukee, Wis.—When snow accumulates up to 2 inches, pan-scraping is resorted to, and the snow is removed by teams and trucks to the regular dumps.

Newark, N. J.—After 3 inches of snow has fallen, motor flushers with snow-plow attachments are sent out to push the snow to the gutters, and in the morning it is removed with motor trucks and teams and dumped into sewers if the flow is sufficient to carry it; if not, it is dumped into the Passaic River.

Philadelphia, Pa.—The Bureau of Highways and Street Cleaning has successfully maintained a snow alarm for the last three years. At any hour of the night as soon as the snow starts to fall, the Electrical Bureau notifies the Chief of the Bureau and the engineers in charge by telephone in their respective homes. Each engineer living in the central part of the city is in constant communication with the Weather Bureau and the Chief of the Bureau of Highways, and as soon as the indications point to a continuance of the storm, the snow-fighting equipment is called out. Upwards of 1,000 telephone messages are sent to various parts of the city in calling out squad leaders, inspectors, snow-plows, drivers, team laborers, and officers in various police districts, who aid in getting out the men. In about one hour after the order is given, the horse-drawn plows and motor-driven plows attack the snow in the central business section of the city. These plows are supplemented by laborers with teams, who keep constantly at work day and night, dumping the snow into the Delaware and Schuylkill Rivers.

Every man in the snow removal organization has a particular function assigned to him. Each dump inspector knows his post, and knows just what to do when he gets there. The driver of every snow-plow and every team knows at what point he is to start to load and at what sewer manhole or wharf he is to dump his load. Thus confusion is eliminated. Fighting the snow at night during some of the storms in the last three years has not been an easy task. In the central section of the city snow is removed from all thoroughfares. This work is performed under special contracts and supplemented by the regular street cleaning force, and is under the supervision of a special snow removal organization made up of men assigned to this work from the regular engineering staff. Certain main thoroughfares and all the street crossings throughout the entire city are also cleaned by the regular street cleaning forces, and a large municipal force is assigned to the seven highway district engineers, who supervise this work. A large force is always employed opening up the country roads, where the drifts often completely block traffic. All told, the force employed on snow removal consists of about 4,000 men, 1,200 teams, and 38 horse-drawn and 20 motor plows.

To ensure the efficient operation of snow removal work, the following instructions and forms have been provided:

- (a) A set of detailed instructions which definitely indicate to the persons supervising the work, the nature of the work to be done and the methods to be used in its performance
- (b) A map indicating the highways included in each of the nineteen central snow removal districts and the nature and exact location of the snow dumps
- (c) An organization schedule indicating the name,

call address, telephone number, and the assignment of each person detailed to snow removal supervision

- (d) Tickets of distinctive colors for loading and dumping respectively
- (e) Ticket issue records
- (f) Current status of work records
- (g) Squad leaders' daily reports
- (h) Squad leaders' daily report summary

The central business section is divided into 19 districts, each district being under the supervision of a squad leader to whom is assigned a number of inspectors, some of whom supervise the removal of snow, while others see that it is properly disposed of at the dumping places. The inspectors supervising the snow removal see that the snow is properly plowed into windrows adjacent to the curb and then piled up and hauled to the dump. They are also required to measure and calculate the cubic capacity of all hauling

vehicles and see that they are properly loaded, after which they give the driver a loading ticket, to be exchanged at the dump for another ticket, which is retained by the driver and upon which payment is made.

The inspectors at the dumping places are required to see that the snow is properly dumped and that no improper material likely to obstruct the sewer is mixed with the snow. In sewers where there is not a sufficient flow of water, a water jet has been provided, which serves to increase the flow of the sewer, and this is regulated by the inspector.

Worcester, Mass.—A four-horse scraper is used to throw the snow back from the street railway tracks to the curb, thus forming a windrow, which permits the teams with carts to stand for loading between the car track and the windrow, without danger. Snow is loaded into sleds and drawn to the main sewer and dumped through manholes. The snow melts after going a short distance and goes through the regular filtering beds on the outskirts of the city.

Highway Research Work Assured

The Engineering Foundation, the Chairman of which is Charles F. Rand, 71 Broadway, New York City, past President of the American Institute of Mining and Metallurgical Engineers, has already raised a fund of \$500,000 to be applied to highway research. The Foundation is seeking to increase this fund to \$5,000,000, the income of which will readily carry out the work.

Functioning through the Engineering Division of the National Research Council, it is planned to cooperate all the agencies in highway research and, aided by the Federal Government, to employ highly trained research men who will gather scientifically the great mass of fundamental facts underlying the economic construction of modern types of highways. These data will be distributed among road builders in every state.

Many national bodies are actually cooperating with the Engineering Foundation and the Engineering Division of the National Research Council. Among them are the American Association of State Highway Officials, American Society of Testing Materials, Society of Automotive Engineers, Bureau of Public Roads, National Automobile Chamber of Commerce, American Society of Civil Engineers, American Institute of Consulting Engineers, American Society of Mechanical Engineers, Association of State Geologists, Western Society of Engineers, American Concrete Institute and American Automobile Association. Also the Engineering Departments of Columbia, Harvard and Yale, and the Universities of Maryland and Illinois, and Iowa State College.

The National Health Council

The need of coordination of the work of national voluntary health organizations has been appreciated for many years. Action to organize these activities resulted in a conference held in Washington on December 10, 1920, at which meeting a National Health Council was created. The membership includes the American Public Health Association, American Red Cross, American Social Hygiene Association, Council of State and Provincial Health Authorities, Council on Health and Public Instruction of the American Medical Association, National Child Health Council, National Committee for Mental Hygiene, National Organization for Public Health Nursing, Na-

tional Tuberculosis Association.

It has been decided that the legitimate field in which the Council might function should include (1) a special information bureau, (2) a legislative bureau, (3) the coordination of health activities, (4) periodic joint conferences, (5) a statistical bureau, (6) the development of educational health material. It is anticipated that the financial resources of the Red Cross and other participants will be sufficient to enable the Council to establish an office and staff and to undertake first those activities promising the greatest benefit to member organizations and through them to the country at large.

Water-Supplies and the Typhoid Rate

The Massachusetts Method and a Warning in Reply

By H. W. Clark

Chief Chemist, Massachusetts Department of Public Health

DURING the last 35 years the typhoid fever death rate of Massachusetts has decreased from 45 per 100,000 inhabitants to less than 3 per 100,000 inhabitants, or, to be exact, 2.6. During the same period—namely, 35 years—public water-supplies in the state have increased in number from 110 to 213, and the percentage of population using these supplies from about 78 to 96. Furthermore, during this period many poor supplies have been abandoned, better supplies, including the Boston Metropolitan system, have been introduced, and more systematic and thorough guardianship of watersheds has been exercised. Undoubtedly the largest factor in the tremendous decrease in the typhoid death rate of the state has been the introduction of public water-supplies and the doing away with the use of contaminated well waters.

With the introduction of public water-supplies, sewerage systems have been installed in all the cities and large towns, and with these two modern conveniences, privy vaults and other like contrivances have vanished and the bathtub has brought about greater personal cleanliness. The old methods of caring for the sewage of a family not only continually polluted the domestic well waters in use, but caused the breeding of innumerable flies, which spread disease by contaminating milk and other food. In Massachusetts the discharge of the sewage of a municipality into a river used afterwards as a water-supply occurs in only one instance, namely, that of the Merrimac and its tributaries above Lawrence. Furthermore, greater watchfulness of state and municipalities over milk supplies and food in general has also been scientifically developed during the same period, each new reform in sanitation reacting favorably upon the others and greatly influencing the health and well-being of every community.

Typhoid fever epidemics due to the use of polluted water, contaminated milk and other causes have diminished rapidly, un-

til to-day practically all typhoid occurring in the state is due solely to typhoid carriers. All health authorities agree, however, that a pure water-supply is the chief factor in controlling typhoid and that a polluted water-supply furnishes the greatest danger of a serious and widespread epidemic.

Filtration and Chlorination

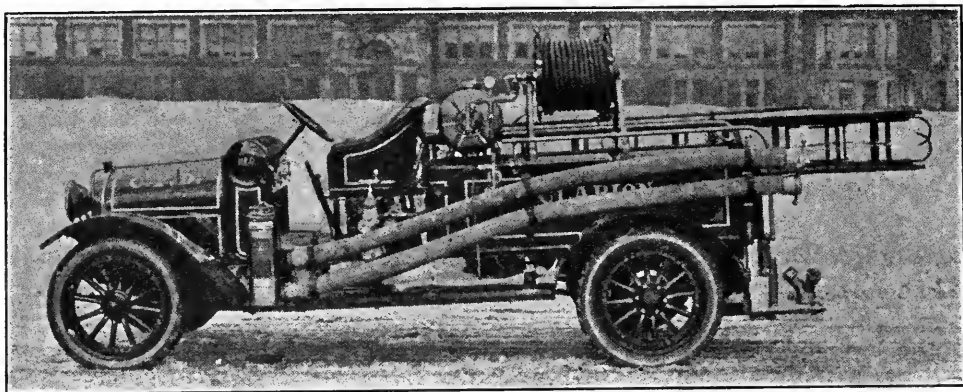
During the last 25 or 30 years two important methods of purifying water have been quite fully developed, namely, municipal filtration and the use of chloride of lime or liquid chlorine. The writer firmly believes in the value of filtration and urges filter installation strongly wherever a water-supply needs such purification. The value of hypochlorite or liquid chlorine has also been too well established to need much discussion here. As efficient as chlorine treatment is, the writer feels that it is not in the same class as a purification measure with adequate filtration, and should be considered solely as an adjunct.*

Throughout large sections of the country, especially where polluted river waters have to be used as municipal water-supplies, filters or chlorine treatment, or both, are absolutely necessary; and that filtration is an efficient method of eliminating water-borne typhoid, an enormous amount of reliable data collected during the past 25 years has absolutely proved. To be successful, filters must be of suitable construction, adapted to the water which they are filtering, and operated under good supervision; in other words, they must be designed by experts and operated under expert supervision.

At the present time it is understood that approximately 22,000,000 people in the country are using filtered water and that liquid chlorine or hypochlorite installations have been made in upward of 2,500 cities and towns. Massachusetts, however, has very few filters in operation and

* See Colonel George A. Johnson's discussion following this article.

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few chlorine plants, yet it has the lowest typhoid fever death rate of any state in the country. Of the 3,700,000 people, more or less, within its borders using or having access to public water-supplies, about 400,000, or not over 11 per cent, use filtered water. Lawrence, Lowell, Newburyport and Springfield are the only cities and Brookline the only large town filtering their supplies. Of course, there are other filters, as at Middleboro, Reading, Cohasset, Norwood, etc., but the actual population of the state supplied in this way is comparatively small. Moreover, of the four large municipalities mentioned as filtering their supplies, only one—Lawrence—does so on account of bacterial pollution; Springfield filters to improve its water physically, and Lowell and Brookline to remove manganese and iron, as do a number of the smaller towns in the state. Only seven municipalities in the state have chlorine plants in operation all or part of the time, and one of these is Lawrence, which first filters its supply.

The policy of Massachusetts for the last 35 years has been to obtain for every city and town a water-supply that is safe and can be used for all domestic purposes without any purification treatment other than storage. The state has been almost phenomenally successful in accomplishing this. From the great metropolitan supply furnishing water to Boston and 20 surrounding cities and towns, down to the smallest supply, they are all practically safe at the present time, if we can judge from our typhoid fever death rate for the last few years.

Nearly 100 cities and towns in the state have ground-water supplies, and the remainder use surface water. The ground waters are taken largely from driven wells 25 to 59 feet deep, although many large curb wells are in use. These ground waters are, generally speaking, colorless, although there are a number of exceptions to this; they are usually soft, contain little organic matter, and many are equal to or better than the most famous or best-exploited New England spring waters sold at high prices throughout the country. They are all generally low in bacteria, and many of them often sterile when examined. Such waters are, of course, absolutely safe without filtration or chlorine treatment, and their introduction and use

in so many cities and towns has undoubtedly had a great influence in lowering and eliminating typhoid in the state. They may perhaps be considered slowly filtered rain water. This water takes up in some instances slight amounts of organic matter when entering the soil, but this organic matter is eliminated or at least oxidized by the exceptionally slow filtration of the water on its way to the wells.

Now in regard to surface supplies the following can be said. Massachusetts is a thickly populated state containing 3,851,000 people, or 419 per square mile, and the population is increasing rapidly. This population is largely concentrated, however, in the eastern or metropolitan section of the state and along certain river valleys where water-power has been developed and railroad facilities are excellent. Large areas of the state contain no more inhabitants per square mile than one hundred years ago. These areas are frequently hilly and the rainfall high; their brooks, rivers and lakes contain an abundant supply of good water. These waters before use are practically all purified by storage, and such slight pollution as may from time to time occur on their watersheds has so far been almost invariably cared for by storage. They are low in bacteria when entering the supply systems, and the last water-borne typhoid epidemic in Massachusetts, due to a public water-supply, occurred so long ago that I doubt the possibility of its being easily recalled.

The following table gives the typhoid fever death rate of a large group of Massachusetts cities and towns aggregating 400,000 population using ground water-supplies, and a group of cities and towns totaling 1,500,000 people using surface water. Included in the surface-water group are Boston and a number of other cities and towns using the metropolitan water. These figures are for the ten years 1910 to 1919 inclusive.

Examination of the table makes clear that the two groups of municipalities have about an equal number of deaths yearly from typhoid fever per 100,000 people. There is no question that the ground water-supplies included in this table are absolutely safe. Bacterially they average better than the best filter effluents, and it goes without saying that if they are safe

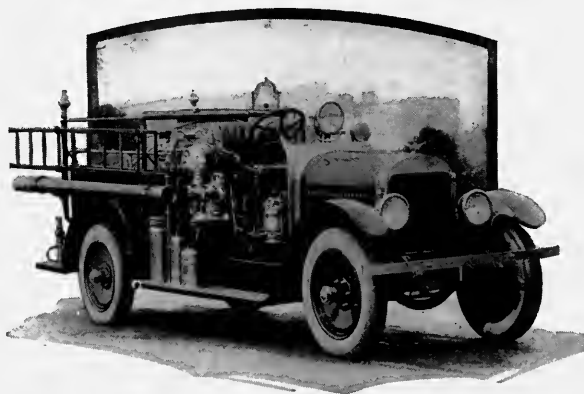
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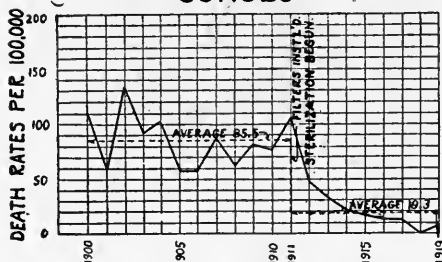
TYPHOID FEVER RATE PER 100,000

Municipalities with—	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919
Surface water-supplies.....	12.9	8.9	8.0	9.1	8.6	6.0	3.5	3.6	3.2	2.6
Ground water-supplies.....	12.9	6.6	8.1	4.5	8.1	8.9	6.7	2.8	2.4	3.0

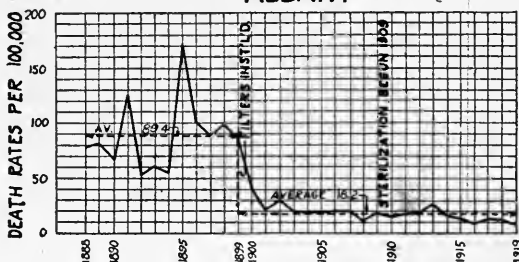
the towns receiving surface water-supplies and showing typhoid death rates as low are receiving equally good and safe water. That is the story of Massachusetts to-day

in regard to safety of water-supplies without filtration and without chlorine treatment, except in the few instances I have mentioned.

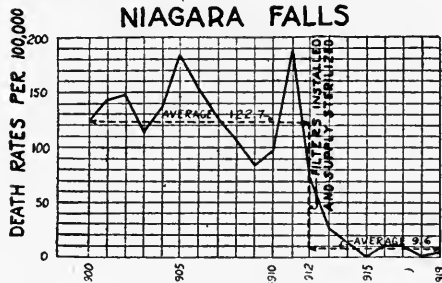
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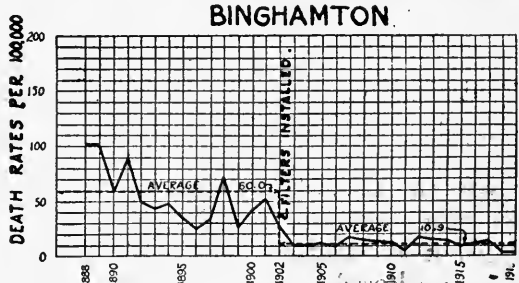
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DIAGRAMS SHOWING THE REDUCTION IN TYPHOID RATES IN CITIES OF NEW YORK STATE AFTER THE INSTALLATION OF FILTERS AND STERILIZATION

A Discussion of Mr. Clark's Paper

By Colonel George A. Johnson

IS it practical, is it possible, to maintain a surface water-supply in a state of natural purity? There is no debate, it is not. All surface water-supplies, including those of Massachusetts, are open to dangerous pollution at all times. Where there are growing communities there will always be dangerous wastes produced by such growths. No man or group of men can be depended upon to so care for those wastes that they will not in part somewhere, sometime, pass into the waterways which drain such polluted areas. And always there is the potential danger that the water-supplies derived from such watersheds will sometime, somehow, become in-

cidentally or accidentally polluted with disease germs.

The writer does not feel that Massachusetts is doing all that sound sanitary logic dictates. She has an enviable record respecting water-borne diseases, brought about largely through the efforts of the State Board of Health in setting up lines of primary prevention, but she ignores such sure secondary and tertiary lines of defense as filtration and sterilization where such expedients are not positively demanded by the known gross pollution of the raw water-supply. Every state, every city, must avail itself of all modern safeguards in order to insure for all time an



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adequate protection against the ravages of water-borne epidemics.

All surface waters untreated before public consumption are potentially dangerous. All the efforts and good intentions in the world cannot eliminate the possibility that sometime a typhoid carrier, perhaps among the watershed patrol, or a chance traveler over the watershed, or a leaky or overflowing cesspool or other point of deposition of the excrement of the inhabitants, or an isolated farmhouse in which there is typhoid fever in incipient, active or chronic form, may contribute poison to a public water later used for human consumption, and cause typhoid fever in the consumer. It is a matter which is uncontrollable except through the exercise of diligence and uniformity of application in setting up such secondary and tertiary lines of defence as filtration and sterilization of all surface waters. Failure to recognize the soundness of this logic, which is founded on indisputable proof and past experience, may result in a repetition in Massachusetts of the typhoid history of Plymouth and New

Haven, where the water-supplies taken from watersheds but sparsely populated became suddenly and "accidentally" contaminated from one case of typhoid, and epidemics promptly followed.

The writer must be understood as in no wise attempting to belittle the truly remarkable health record of Massachusetts. It is an accomplished fact and susceptible of no criticism other than this: in public health matters one must not stand still or, in other words, stand on a good record of the past. The potentialities of the present and the future must be jealously regarded lest the public health suffer.

Where the public health is at stake, reasonable money expenditures are, or should be, no object, and the evidence is conclusive that any amount of money spent for pure water, if it prevents typhoid fever, is money well spent. The balance is always on the right side of the ledger. Parsimoniousness in such matters or adherence to what the writer considers a "part-way" policy, cannot be justified on any ground other than a mistaken idea of economy.

Are You Organized for Emergency Relief?

Should there be a fire of great magnitude, an explosion, a serious subway accident or any similar disaster in New York City at any time, several thousand trained volunteers are ready to report for duty on a moment's notice. Organized into an emergency unit by the New York County Chapter of the Red Cross, these trained nurses, ambulance drivers, canteen workers and first aid workers are equipped and ready to handle 10,000 casualties a day.

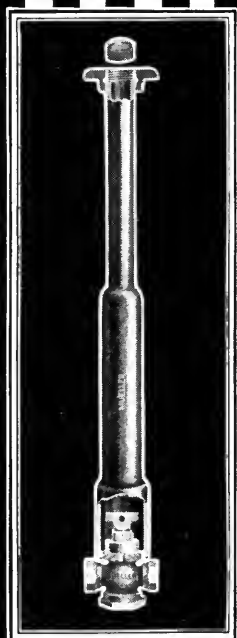
Large supplies of surgical dressings, garments of all sorts, operating equipment, litters and cots lie in the Red Cross warehouse, in readiness for immediate transportation. Day and night the garage, housing nineteen Red Cross ambulances, is open, and a garage force of seven men keeps the cars in constant repair for use in transporting possible disaster victims to the hospitals. There are four drivers on regular

duty and an unlimited number of women of war-time motor corps experience who are ready to be called on in case of emergency.

The stock of canned meat, condensed milk and coffee stored in the canteen is sufficient to supply a small city. The canteen corps has equipment for making 600 gallons of coffee in 40 minutes and can serve 700 persons in 5 minutes.

The disaster relief unit has already been called on for service many times—the most notable being the Wall Street explosion. A Red Cross truck, loaded with first aid supplies, arrived on the scene twenty-five minutes after the disaster occurred.

This is what New York City has done. Every city, town and village in the country, through its local Red Cross chapter or other organization, should in some similar manner be prepared to give immediate relief to sufferers in case of emergency.



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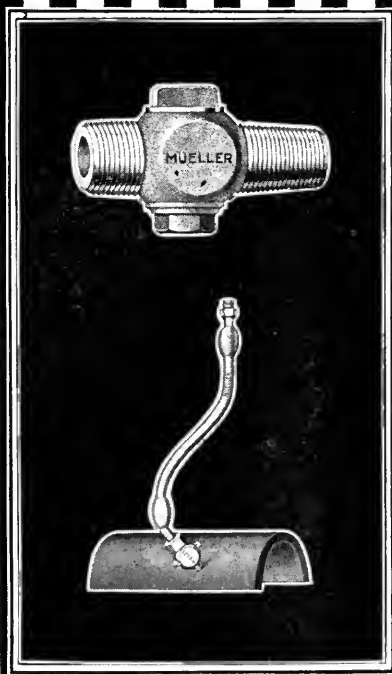
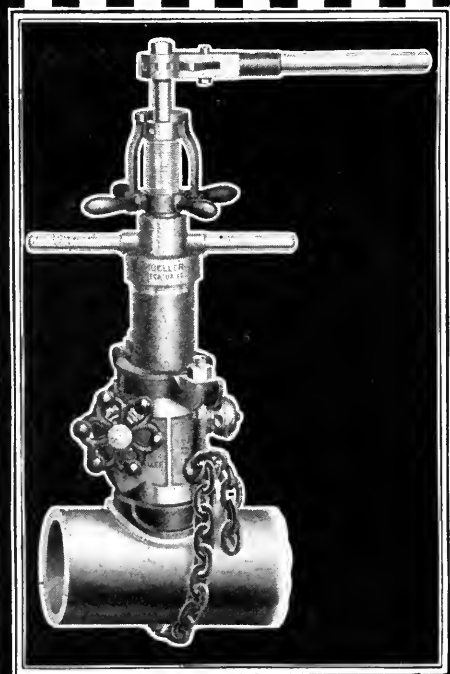
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Drainage to Combat Malaria Fever

By George Parker

Sanitary Engineer, International Health Board

AT the present time sanitary engineers representing national, state and local health organizations are busy combating malaria. It is essentially an engineer's problem through the necessity of destroying the breeding areas of the *Anopheles* mosquito.

What causes malaria fever? An organism or germ that is introduced into the blood through the bite of the female *Anopheles* mosquito, which obtains the germ by sucking the blood of a person sick with the disease. It follows that even if we have these mosquitoes, and there is no person in the neighborhood ill with malaria, the mosquitoes cannot obtain the infection to spread the disease; or, even if infected persons are present, if there are none of this species of mosquito to transmit the disease, malaria will soon die out. But we have both—the infected people and the mosquito, and the latter is ever busy transplanting the germ of infection.

Mosquitoes breed only in water, the slow-moving stream with irregular banks, swamps, ponds with grass-grown edges, etc., forming the selected areas for the *Anopheles* or malaria-carrying mosquito to breed in. Through the elimination of these places the mosquito is destroyed, and consequently the transmission of malaria ceases. This is only one of the methods employed in controlling the propagation of this kind of mosquito, but it unquestionably ranks first in importance, and is most satisfactorily and economically handled by the engineer.

Besides freeing a community of malaria fever, the removal of the water from swampy sections uncovers tracts of land for cultivation or other use, which would otherwise have remained a menace to the community.

As swamps form on the lowlands, it is very often found that extensive and extremely accurate drainage systems must be constructed to relieve them, for they must be drained absolutely dry to gain the desired result, and such systems must be so constructed as to function properly in years to follow.

The Use of Fish in Combating Mosquito Breeding

In a report by G. W. Park, Inspector, Bureau of Sanitary Engineering, Texas State Board of Health, he states that the Bureau has found the fish "*Gambusia Affinis*" a wonderful help in abating mosquito breeding, thus aiding in anti-malarial work. This fish is the minnow commonly known by fishermen as the "pot belly." The species has no general outstanding external markings. It possesses the combined features of the several top-minnows and thus is hard to distinguish without becoming thoroughly familiar with live specimens.

The average length of the female is about 2 inches, and that of the male is about 1¾ inches. It feeds at the surface and subsists principally on insect larvae. It is very vigorous and hardy and does well when subjected to different changes in natural conditions. They are very prolific, easily propagated and reach areas not inhabited by any other species. They have an exceptional devouring capacity, and their general habits lead them to live in the identical areas where the mosquitoes breed.

The *Gambusia Affinis* as a control measure may be applied to such areas as stock ponds, watering-troughs, surface reservoirs and the like where oiling and draining is impracticable. To obtain the best results, the water area to be treated should primarily be conditioned favorably for natural propagation of the fish. These conditions include:

1. Clean edges and surface free from debris and floating vegetation
2. Sufficient clear, shallow edges to provide protection against game fish when present
3. Sufficient vegetation on bottom of area, to reduce artificial feeding to a minimum
4. General attention and occasional feeding when needed
5. Exclusion of unnecessary disturbances, especially in small areas

In introducing the work in a community or municipality, a hatchery may be designated and established. This should be encouraged for educational and demonstration purposes. Great care should be exer-



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This 128-Page Medart Catalog is recognized everywhere as a text-book on Playground Planning and Installations. It shows in detail just what apparatus is best suited for boys, for girls and for smaller children. It shows ideal playground layouts, where cost is secondary to service and it shows, too, what combinations are most desirable for smaller communities or centers where only a limited appropriation is available.

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PRODUCING AND REDUCING THE MALARIAL MOSQUITO

Upper left—Concrete spillway acting as dam. Back water at upper end of lake forms swampy areas producing anopheles. Lower left—Swampy condition mentioned above, which was relieved by diverting a small stream to pass through the area and gradually filling in by silt carried down stream during rains. This area could not be drained without lowering the concrete spillway, hence the method described

was used. Right—Drainage system being constructed through area that for years remained water-soaked and a breeding-place for anopheles

cised in collecting and distributing the fish. The required number to stock an area depends entirely on size, condition and time. Several thousand impregnated females are considered sufficient for an average pond of about 10,000 square feet surface area, stocked in the early spring. Typical food consists of bread crumbs, minced liver or fish, and yolks of boiled eggs.

At the present time the Bureau of Sanitary Engineering of the Texas State Board of Health is making a test of the length of

time this fish can live without food and its adaptability to stale, stagnant water. On September 1, 1920, six of the fish were placed in an aquarium. Since that time they have not been fed nor has the water been changed. One died when they were first placed in the aquarium, and the other five have continued to live and are hardy. This is considered a very good demonstration of the fact that they will survive even under most trying conditions and will hence aid mosquito extermination.

Banner for Best Milk in New Jersey

The *Montclair Herald*, Montclair, N. J., reports that as a feature of the State Farmer Week exhibit at the Second Regiment Armory, Trenton, N. J., the city of Montclair won the right to fly the State Championship Banner for the best milk served to consumers in its community in the state-wide dairy market competition. This competition has greatly interested health officials,

civic societies and consumers associations, and many cities have awaited with interest the result of the scores. Montclair's score in the raw milk class was 93.3, said to be the highest ever obtained by a New Jersey community. Newark scored 78.4 and Atlantic City, 77.7, both of which are considered as high records.



*Water Street, Torrington, Connecticut,
constructed with "Tarvia-X" in 1909.
Maintained with "Tarvia-B."*

A Tarvia Pavement— ten years old and still new—

THE Tarvia road above is Water Street, Torrington, Connecticut.

This street was constructed with "Tarvia-X" as a binder in 1909, and for three years thereafter required no maintenance whatever. Since then it has been kept in tip-top shape by an occasional inexpensive treatment of "Tarvia-B." It is an excellent example of the durability of a properly maintained Tarvia pavement.

Torrington is a busy manufacturing town where there is plenty of heavy traffic, and its satisfactory experience with Tarvia may be taken as typical. Whenever Tarvia is given a fair trial it invariably

makes good. And the fact that towns which once begin to use it continue using it in increasing quantities year after year, is the finest kind of endorsement it could have.

There is a grade of Tarvia and a method of application suitable for new construction, for resurfacing, for general road maintenance, for dust-prevention and for patching.

Tarvia gives a road a tough, resilient surface that is dustless and mudless and resists the severe wear-and-tear of modern motor traffic.

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Belknap

Validity of Garbage Ordinances

Right of City to Control of Garbage Is Paramount to Property Right of Owner Thereto

By A. L. H. Street

THE right of the housewife to convert the remnants of Sunday's pot roast into hash remains inviolate under the decision of the Michigan Supreme Court in the case of *Pantlind vs. City of Grand Rapids*, 177 Northwestern Reporter, 302. But the same decision shows that the municipality has something to say as to what becomes of the remnants of the hash. In short, no constitutional right exists in the possessor of garbage to feed it to the family porker being fattened in the private piggery at the rear of the home, nor to market it at personal profit to some one who may desire it as provender for his swine, as against the right of the municipality to promote the public health by taking unto itself the matter of disposing of refuse. The same reasoning is applied to hotels, restaurants and other wholesale producers of garbage.

A similar conclusion is reached by the Utah Supreme Court, and both that tribunal and the Michigan Court refer to a decision of the United States Supreme Court as supporting their conclusions.

In the Michigan case, plaintiff sued to enjoin the defendant from enforcing a garbage disposal ordinance to his prejudice in being prevented from using the garbage produced at his hotels in feeding swine and poultry at his farm several miles distant. The Trial Court ordered an injunction, but the Supreme Court reversed the decision.

The ordinance authorizes the local Board of Health to contract with some suitable person or persons to provide proper tanks for the reception of garbage, to collect the garbage and dispose of it, under regulations adopted by the Board. Transportation of garbage, dead animals and other unsanitary matter through the streets, excepting by licensed persons, is forbidden.

Other caterers were permitted to join in the suit as plaintiffs, and the evidence showed that cleanliness characterized the keeping and handling of their garbage. In part, the Supreme Court says:

"As to the right of plaintiffs to those wholesome substances, leavings of the kitchen or table, which are fit for food, we quote from the [case of] *city of Grand Rapids v. De Vries*, supra:

"* * * It may be said that the ordinance does not attempt to regulate in any manner whatever the disposition of wholesome substances by the householder. It is aimed only at refuse; that is, discarded, worthless matter—matter unfit for food. The householder has perfect liberty, under the ordinance, to consume, or to sell or give away, all the leavings of his table or kitchen that are fit for food."

"The above language plainly implies that the city in the exercise of its police power had the right to treat as a nuisance all such refuse as is unfit for human food. . . . Wholesome substance may be distinguished from garbage upon the facts of a given case; but, generally speaking, they may include broken bread, meat trimmings, vegetable parts, specked apples, and the like, if fit for food. . . . But when such matter is mingled with garbage it becomes subject to public control. . . .

"It is urged that a person who has produced garbage upon his premises has a right to dispose of it and to convey it through the streets, because it is property of value and that as to him the ordinance is wanting in due process of law required by the Constitution. Upon this point several dead-animal cases, so-called, are cited, but these are not controlling. It is not competent to declare a dead animal to be a nuisance immediately after death. . . . Dead animals are not nuisances in themselves, and the city in its ordinances must pay a proper regard for the rights of the owner on such property."

The Court then proceeds to quote the following language used by the United States Supreme Court in the case of *Gardner vs. Michigan*, 199 U. S. 331, 26 Sup. Ct. 108:

"Touching the suggestion that garbage and refuse are valuable for the manufacture of merchantable grease and other products, it is sufficient . . . to remark that it was a controlling obligation of the city, which it would not properly ignore, to protect the health of its people in all lawful ways having relation to that object; and if, in its judgment, fairly and reasonably exercised, the presence of garbage and refuse in the city, on the premises of householders and otherwise, would endanger the public health by causing the spread of disease, then it could rightfully require such garbage and refuse to be removed and disposed of, even if it contained some elements of value. In such circumstances, the property rights of individuals in the noxious materials



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The Bowser Patented Centrifugal Water Separator is located on the discharge pipe of the pump. Water, being heavier than gasoline, is separated by the whirling motion of the separator and the water is trapped in the separator.

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described in the ordinance must be subordinated to the general good."

In the Utah case—Salt Lake City vs. Bernhagen, 189 Pacific Reporter, 583—the Supreme Court of that state reaches similar conclusions under a similar ordinance, against a contention made on the part of defendant that "the enforcement of the ordinance by the municipality is not destroying property in the interest of health, but the effect is to take property of value from one and give it to another; that if the garbage, refuse, etc., is dangerous to health,

and therefore a nuisance in the hands of the owner, it will continue to be deleterious to health and therefore a nuisance when delivered to and taken into the custody of the municipality or its exclusive contractor; that the city can only justify depriving the defendant of property, or the property of his employer, after showing its deleterious nature, and by showing further that it is taken with the intent and purpose of destroying it, or in some way removing the part found injurious to public health."

Community Leaders Will Study European Cities

Tour for Business and Professional Men and Women

AN unusual tour of Europe for the purpose of observing business, social and economic conditions is planned for business men, chamber of commerce executives, municipal officials, and other civic leaders during the summer of 1921. Although the usual objects of interest to tourists will not be neglected, the purpose of the trip will be to put representative Americans in close touch with the active current life of England and the Continent. The executive head of the party is Dr. John Nolen, city planner, whose work is familiar to all readers of *THE AMERICAN CITY*. It is hoped that in each city visited there will be an opportunity to meet the leading local exponents of civic, economic and industrial affairs.

In Great Britain, London, Birmingham, Liverpool and Edinburgh, will be visited with especial emphasis on the manner in which England is meeting the housing problem, and an opportunity to see such garden cities as Letchworth, and Lord Leverhulme's interesting model community at Port Sunlight. Belgium will be visited next.

This will be the first group of representative business and professional men to make such a tour of the Central European States since the war. Germany once had a great deal to teach us in the matter of civic and social administration. Her people are eager to resume business relations with us. There will be ample opportunity to see how the German people are meeting their after-the-war problems in Berlin, Dresden, Munich, and the iron-coal region about Düs-

seldorf and Essen. Fourth of July will be fittingly observed with the Army of Occupation at Coblenz on the Rhine.

Two days will be passed in Vienna, the most hopeless capital in Europe; and two in Prague, the capital of Czecho-Slovakia, the new state that is making such rapid strides in the reconstruction of its civic and industrial life. Then to Milan, where centers the interesting industrial experiment in the control of factories by the workers. This situation will be interpreted on the ground by a competent Italian authority, after which the party will turn north to Berne, Lucerne, and Geneva, the meeting-place of the League of Nations.

The end of July will bring the party to Metz and "American France"—St. Mihiel, Verdun, the great cemetery at Romagne, the Argonne, Rheims and Chateau Thierry. The greatest battlefields in history will be visited before time has obliterated the marks of the conflict; another summer, and the "devastated areas" will be superficially restored to their normal life. The tour will come to its conclusion with four days in Paris.

Although the itinerary has been arranged with a view to meeting the interests of men, women will be welcomed and their interests provided for, as it is recognized that women are taking a constantly increasingly active part in American civic life.

Full information may be obtained from A. E. Bailey, of the Intercollegiate Tours, 65 Franklin Street, Boston, Mass.

THE AMERICAN CITY

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Whether used in the city street, the country road or state highway, Newport culverts give dollar for dollar service. In all the years we have been making these durable culverts, we have yet to receive a complaint regarding unsatisfactory or defective service. However, we have received dozens of letters complimenting us on the merits and the lasting qualities we have put into our products

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Municipal Finance

BONDING

ACCOUNTING

TAXATION

Proper Publicity for Municipal Bond Offerings

By Sanders Shanks, Jr.

Editor of The Daily Bond Buyer of New York

IN the course of a normal year, the states, counties, cities, villages and taxing districts of the United States sell about five thousand issues of bonds aggregating from four hundred to seven hundred millions of dollars. These issues range in size and importance from the one-thousand-dollar paving loan of a small Ohio village to the fifty-million-dollar corporate stock issue floated by the city of New York for the building of new subways. From Canada to Mexico and from Maine to California, every state is represented in this long list of borrowing for the building of roads and bridges, schools, court houses, jails, water-works plants, fire department buildings, electric light and power plants, public market places, sewer systems, parks, etc.

State and municipal bonds, considered from an investment standpoint, constitute one of the highest-grade American securities, second only to United States Government bonds. Carefully guarded by constitutional and statutory provisions, these securities enjoy the confidence of the most conservative investors in the country. It is a well-recognized fact that there is always a demand for municipal bonds, regardless of factors which oftentimes make it difficult for other classes of borrowers to obtain accommodations.

Public Sale Method of Bond Selling

When a city issues bonds it must consider among other things the problem of disposing of those bonds. The law governing the creation of municipal indebtedness usually requires that bonds be sold at public sale. In some cases municipal officials are permitted to choose their own method of negotiating the sale of the bonds, but as a rule

the law requires that sealed bids be invited and the bonds be awarded to the highest bidder. This is simply an application to the sale of bonds of the same rule that is almost universally followed by state and local governments in purchasing supplies of all kinds. "Public letting" or "Public bidding" is recognized as the only guarantee of competition and the only competent safeguard to protect the public treasury against overcharging or other forms of graft in the dealings of the municipalities with contractors, merchants, etc.

The private sale of bonds (and a public sale ineffectively advertised is virtually a private sale), except in very unusual and infrequent instances, was long ago condemned by most states as unsafe and costly to the borrowing municipality, and is discouraged by the largest and most representative bond dealers. This method offers to the unscrupulous buyer of bonds an opportunity to purchase bonds considerably cheaper than they could be bought at a public sale where the element of competition is present. It is not an exaggeration to state that thousands of municipal bond issues have been purchased in this manner at prices representing far less than their true market value, because of the absence of competitive bidding and the ignorance of officials with respect to bond values.

The problem which the city official charged with the duty of marketing a bond would do well to consider is that of attracting to his bond offering sufficient attention among bond buyers to assure a number of bids submitted in actual competition. It would, of course, be a difficult task for a small town or city to reach the thousands of wealthy investors, saving banks, trustees,

DOW Calcium Chloride Flake Preserves Gravel and Macadam Roads

What wears out macadam or gravel roads?

Small *loose* particles are blown away as dust—they are pulled away by the vacuum created by rapidly moving wheels.

Every time a layer of dust raises, every time tiny particles are thrown or washed away, still another layer is exposed to the disintegrating action of traffic and the elements until the road surface is broken down.

Dow Calcium Chloride Flake binds the small particles together so that each is held by its neighbor in a vise like grip. The Calcium Chloride takes sufficient moisture from the air to retard the dusting away.

Dow Calcium Chloride Flake provides the binding properties lacking in dry gravel, aids packing, retains moisture, provides adhesion of one particle to the other. It makes a dense, hard, long wearing surface.

The Michigan State Highway Department, after thorough research on binders and dust preventives for gravel and macadam, have used and are using thousands of tons of Calcium Chloride on graveled trunk roads.

Dow Calcium Chloride Flake is made on the same precise accurate basis as are the vast quantities of other chemicals produced in the Dow plant which covers more than one hundred thirty-five acres of ground and employs more than one hundred graduate chemists and internationally famous research men.

If you would make a reputation for low cost road maintenance and longer lasting roads, let us discuss with you by letter at once, the value of Dow Calcium Chloride Flake for your particular road problems, whether on trunk roads or in parks, cemeteries and private estates where dust prevention is a problem.

The Dow Chemical Company

Midland, Mich.

U. S. A.

TRADE

The word "DOW" is written in a large, bold, serif font, centered within a large diamond shape formed by a thick black border. The diamond is oriented with its points up and down.

MARK

insurance companies, fraternal orders, sinking funds, and other buyers which constitute the broad market always existing for municipal bonds. But this is not necessary, even were it advisable or even practicable.

The Municipal Bond Dealer

Scattered throughout the country, but with their offices in twenty or thirty of the principal cities, there are a few hundred investment banking firms or companies which make a business of buying municipal bonds and reselling them to investors. Sometimes these dealers operate in a restricted territory, specializing in bonds originating in a single state, while others, maintaining offices in a dozen cities, deal in bonds issued throughout the country. They purchase the bulk of all state and municipal bonds sold, and, because of their ability to resell them in the market where they will bring the highest price, they are in a position to make the municipality the best bid.

But these dealers cannot bid for the bonds of a city unless they are advised that the city has bonds to sell. And they cannot read the local newspapers printed in every little community in the United States. In order to find out when and where bonds are to be sold. And so, the problem of the borrowing city resolves itself into the simple matter of getting in touch with a comparatively small number of well-known and easily found specialists who will bid in competition for its bonds and take them at a price representing the real value of the securities in a market as broad as any market in the world.

These specialists in municipal bonds may be reached through the medium of financial newspapers, especially those publications which make a specialty of publishing bond news and official advertisements of municipal bond offerings. Because of the peculiar nature of this business, the municipal bond dealer must rely upon such publications to collect news of bond offerings for him, and so he becomes a regular and careful reader of the best of such newspapers.

Experts Agree on Public Sale and Bond Dealer Advertising

In a booklet distributed a few years ago among municipal officials by a prominent Baltimore banking house, T. Stockton Matthews, a municipal bond dealer of wide

reputation, says:

"It pays to advertise in selling bonds as well as other commodities. While there are some exceptions when a private sale of securities will net the best price, yet, as a general rule, those issues which are intelligently and systematically advertised for sale will be most profitably and creditably placed. The best, and in fact the only suitable, medium for such advertising is the standard financial journals and magazines which have among their subscribers practically all of the active and reliable dealers in municipal bonds in this country. The advertisements which are inserted in these columns are carefully and closely scanned."

Few States Recognize Importance of Proper Bond Advertising

Strange as it may seem, but few states require by law that notices of bond sales be published in financial papers. The general rule is that a city publish its bond offering notices in the same local newspapers in which legal notices of interest only to local people are inserted. This sort of publicity is, of course, largely ineffective in reaching bond buyers located outside of the community reached by these local newspapers.

The municipal bond lawyer, through whose hands hundreds of issues of bonds pass, has come to be regarded as an expert on the procedure and practice incident to the issuance and original sale of municipal bonds. He is in an excellent position to note the results of the many different methods employed by municipalities in various sections of the country in the negotiation of bond issues, and is consulted more and more each year by municipalities for advice with respect to the proper way to go about the marketing of securities. The recommendations of several of the most prominent of these bond lawyers has a proper place in this discussion. L. L. Delafield, Jr., of the firm of Hawkins, Delafield and Longfellow, of New York, says:

"Advertising in a local newspaper of a small municipality is of very little use in obtaining bidders for bonds. It may be justified to require such advertising in order to give the citizens of the municipality knowledge of the fact that its officers propose to hold a sale, so that the citizens may attend to see that all goes well, but bids are not obtained in this way.

"In order to obtain bids for municipal bonds, there is no better method than to publish the notice of sale in one of the financial papers that specializes in this class of advertising. I have known of individual cases where the delay incident to a public sale in a falling market has cost the municipality money, but in the long

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This machine will positively handle your snow removal at a saving of 90 per cent over any other method now in use. The Friedman "Snow-Loader" has been used in New York City with unbounded success and satisfaction, loading trucks of 8 cubic yards capacity, at an average speed of 60 seconds. If these statements interest you, it will pay you to write for further information concerning the most efficient snow-fighting machine yet developed.

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67 East 93rd St., New York City

run I am satisfied that the best policy requires a public sale. The financial papers are searched daily by all the bankers and investors who are interested in purchasing at the sales held by municipalities. Competition is keen, and a sale after advertisement in such a paper, in the vast majority of cases, will bring the best price obtainable."

We may also quote the firm of Caldwell & Raymond, of New York, as follows:

"There can be no question that better results will be obtained from advertising original offerings of municipal bonds in financial publications than from advertising them in newspapers of general circulation, whether the latter have only a local circulation or a general one. Practically all such original offerings are sold to dealers, bids, if any, received from private investors being in most cases out of line with market conditions."

Another municipal bond attorney of note, Robert R. Reed, has advocated, as attorney for The Investment Bankers Association of America, the public sale of municipal bonds. Mr. Reed says that a mandatory public sale provision for municipal bond sales "seems to be gaining in favor and is generally desirable from the municipality's standpoint. We practically always advise a public sale when our opinion is desired by the municipality."

A convincing argument in favor of advertising original municipal bond offerings in financial publications is made by Chester B. Masslich, of New York, a bond lawyer who has been associated with the municipal bond business for a great many years. Mr. Masslich says:

"Excellent reasons are responsible for the fact that the ultimate investor is rarely a bidder at original sales of municipal bonds, but prefers to buy them from an investment house which has first placed its own money in the bonds and

investigated their worth. It is therefore to the investment houses that municipalities must look. A journal devoted to current municipal bond news naturally goes into the executive offices of all these investment houses, and every advertisement in its columns becomes immediately known to these houses."

New Jersey's Public Sale Law

In recent years the New Jersey Legislature has made an intensive study of the whole subject of municipal finance, which has resulted in the passage of the "Pierson Bond Law." (Chapter 252, P. L. 1916, as amended.) Under this modern statute, New Jersey municipalities are financing themselves in the most modern, businesslike and economical manner, and the Pierson Law is recognized as a model by other states which are endeavoring to modernize their bond laws.

Arthur N. Pierson, author of the law referred to and a keen student of public finance, states in a letter to the writer:

"I am convinced that all bond sales should be advertised as widely as possible; especially in such financial papers as reach the bond dealer and investor. Through such mediums alone can we hope to get true competitive bids on our offerings."

The viewpoint of the experienced city treasurer should be of interest in this discussion. Here is the way City Treasurer R. N. Young, of Salt Lake City, sizes up the proposition:

"It is an old saying that if you want to get money you go where money is, and I cannot conceive any corporation or municipality undertaking to dispose of securities without availing themselves of the services of a medium of advertising that reaches the class of people and interests they must reach if they are to dispose of their offerings."

Encouraging Market for Municipal Bonds

The opening month of the year has seen the successful floating of several important municipal bond issues. Detroit offered two lots, one of \$35,000,000, and the other of \$10,126,000. This was closely followed by the sale of \$11,455,000 4 per cent bonds by the city of Chicago, at a slightly lower figure than that obtained by Detroit.

During the same week Cleveland disposed of \$5,000,000 School District 6's, and Akron

of \$2,000,000. Other interesting issues of the month included \$4,225,000 by Rochester, N. Y., and \$5,000,000 by Philadelphia.

The ease with which these issues have been disposed of has been distinctly encouraging, and while it is not anticipated that there will be any rapid movement in prices, the market is regarded as strong enough to absorb any offerings likely to be made in the near future.



Cletrac Keeps the Streets Clear

THE tank-type Cletrac is being used in many towns throughout the country to keep streets clear of snow and slush. It works equally well pushing a snow plow or pulling an ordinary road scraper.

Cletrac's broad sharp-cleated tracks take it easily over ice and snow on hard or dirt roads.

This tractor has the certain traction and abundant power needed to keep it working steadily right through the worst storms of winter.

Ask your local Cletrac dealer for a demonstration and write us for further facts about Cletrac in municipal work.

SPECIFICATIONS

Horsepower: 12 at drawbar,
20 at belt-pulley
Length: 96 inches
Width: 50 inches
Height: 52 inches
Weight: 3420 pounds
Turning Circle: 12 feet
Traction Surface: About
800 sq. in.
Center to Center of Tracks:
38 in.
Belt Pulley: Dia. 8 in., face
6 in.

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TANK-TYPE
TRACTOR

THE CLEVELAND TRACTOR CO.

"Largest Producers of Tank-Type Tractors in the World"

19205 Euclid Ave.

Cleveland, Ohio

News and Ideas for Commercial and Civic Organizations

Golf Club Financed by Marion Chamber

MARION, OHIO.—The financing of a country club house and a nine-hole golf course is a recent accomplishment with which the Marion Chamber of Commerce is much pleased. The need of these recreational facilities had been discussed by the organization for years, and committees had been appointed to establish them but were always later disbanded because of their inability to get results. The difficulty appeared to be that a division of opinion existed as to the proper location of the course.

Another attempt to launch the project was made a year ago, when it occurred to one of the Chamber's officers to attempt to prevail upon the chairman of the Civic Committee to spend several days at one of the southern winter resorts and become an enthusiastic golfer. The young man did so, and that act "turned the trick." Upon his return he called a meeting of his committee, at which it was decided to gather all the young men of the community together at an early date and secure their cooperation in launching the project.

Country Canvassed for Site

Before these young men were called together, however, and in order that the disappointing experiences of former meetings held for the purpose might be avoided, a canvass was made of all the surrounding territory by three or four experienced golfers in search of a suitable site. One containing 120 acres was found to be available and an option was taken on it, one of the young men giving his personal check to secure it. Two or three other men were then authorized to prepare an organization program and have it ready for the proposed meeting. The program was adopted, with a very few minor changes, at the first meeting of these young men. One committee was promptly appointed to purchase the

real estate, and another committee to set in motion an intensive drive for members.

A holding company and an operating company were then formed. The Marion Country Club Holding Company was capitalized at \$50,000, and holds title to the real estate, which it leases to the operating company, the Marion Country Club Company. The stock has a par value of \$100, bears 6 per cent interest and is non-taxable. The sale of stock was made possible by the large subscriptions which were taken by several of the prospective members of the club, some of whom took as much as \$3,000 worth. The stock was offered at 6 per cent in order to make it an attractive investment.

Securing the Money

It was necessary later to increase the capitalization to \$75,000, because \$50,000 proved to be insufficient to establish a first-class country club. The sum of \$33,000 was paid for the site; it was estimated that it would cost at least \$30,000 to erect and equip the club house, and the building of the first nine holes of an 18-hole golf course would cost \$15,000. Even with the capitalization at \$75,000, this left a deficit of \$3,000, and so, in order not to entirely deplete its resources, the holding company gave a mortgage on the real estate for \$10,000, holding in reserve a sum of money to take care of incidental expenses. The operating company will take over the Country Club when it is ready, and will pay therefor a rental equal to 6 per cent of the money invested by the holding company in the property, plus taxes and insurance. The holding company and the operating company are almost entirely distinct from each other in the matter of their personnel.

Golf playing will begin early in the spring, with nine holes prepared under the supervision of a well-known golf architect. In addition to the yearly dues of \$75, each member of the Country Club will be required to own at least one share of stock in the



Standard Municipal Equipment

The Mack truck has become practically standard for the heavier classes of municipal trucking.

For the reason that Mack construction is more than adequate in every detail for requirements which overtax those trucks whose safety factors are low.

A large number of recent installations have been for street flushing and sprinkling. The Mack combination flusher and

sprinkler embodies several fundamental advantages. Chief among them are single engine system; plenty of power for truck and pump—low operating and maintenance costs—one man operation.

Our engineering department will be glad to consider specific problems of municipal equipment and make unbiased recommendations covering them. An inquiry does not incur the slightest obligation.



INTERNATIONAL MOTOR COMPANY

New York

Capacities 1½ to 7½ tons



Tractors to 15 tons

"PERFORMANCE COUNTS"

operating company. Non-members may also purchase stock in the operating company if they wish. The dues were placed at this high figure to enable the operating company to pay the interest on its stock, as well as to provide a fund with which to maintain the golf course.

The membership has been restricted to 300. Members resigning from the Country Club are required to surrender their stock to incoming members who may be accepted in their places. The stock certificates contain a clause binding members for the payment of the unpaid house bills or dues.

The purpose of restricting the membership to 300 was to make sure that the playing members would always be able to use the course, because an 18-hole golf course will accommodate only a certain number. That number really provides quite a narrow margin, but since this golf course is the only one in the city, it was necessary to allow a slightly larger number of players access to it. The Chamber of Commerce feels that a country club of this character is an undoubted asset to a city because of the opportunity it affords the younger men of the community to get together for wholesome social affairs and participate in healthful recreation, which should make them lose interest in the less wholesome attractions of the larger cities.

HARRY F. PALMER,
Executive Secretary, Marion Chamber of Commerce.

Chicago Safety Council Teaching Accident Prevention

CHICAGO, ILL.—The Chicago Safety Council, recently incorporated under the laws of Illinois, is now a department of the Chicago Association of Commerce, coöperating closely with the National Safety Council.

The Safety Council has undertaken the task of educating the people of this community in safety principles and practices in order to bring about a substantial reduction in the number of accidents of both a public and an industrial character. The Safety Council is a non-profit, non-commercial and non-political organization. The sole purpose of its existence is to make Chicago a safer city. It will conduct its activities by means of various committees, and function through the schools, homes, churches and industries with the object of developing an interest in safety on the part of every one.

Conservation of land, timber, minerals, water-power, etc., has been taught and practiced in this country for a great many years. Conservation of men, of infinitely greater importance, is a relatively new science. This is accomplished by activities designed to educate people in accident prevention, or, as it is commonly called, safety.

Most Accidents Preventable

Experience has taught that at least three-fourths of all accidents are due to causes under control by the victims or by those associated directly or indirectly with the accident; and that about one-fourth of the accidents are chargeable to the failure of materials, lack of proper mechanical guards, etc. This emphasizes the fact that about 75 per cent of all accidents are preventable by education, and it is to this phase of accident prevention that the Chicago Safety Council is devoting its energy.

How necessary it is that every one become interested in this matter is demonstrated by the fact that last year nearly 2,000 people were accidentally killed in Chicago and Cook County; and that in the first ten months of 1920, 440 people met death in this territory, by automobile accidents alone. The Safety Council is endeavoring to make people appreciate that, after all, human life is the most precious asset of individuals and, at the same time, the greatest asset of the nation; that it is better to be careful than to be crippled; that the exercise of caution is a duty which every individual owes to himself, his family, his employer and his country.

Accident prevention is now generally recognized as one of the larger economic problems of the times. It is estimated that last year an average of 222 persons per day were killed in accidents of all sorts in the United States; and that during the nineteen months this country was engaged in the world war, more Americans were killed here at home than on the battlefields of Europe. The National Safety Council estimates that some one is killed somewhere in this country in an automobile accident every thirty-five minutes!

These statistics should convince the most skeptical of the magnitude of the problem in both its humanitarian and its economic aspects. Chicago proposes, through the Chicago Safety Council, to effect a marked improvement in its accident record, thereby

Road-Building by Tractor Quicker and Cheaper

IN breaking new roads, in grading, scarifying, plowing, excavating, leveling, and in heavy hauling, the Best Tracklayer Sixty does the work better and faster than horses and does it at less cost.

Its tremendous drawbar pull enables the Best to maintain an even cut with the grader. The power is unflinching. There are no animals to favor on tough soil. No expert drivers needed to keep horses pulling together. The Best furnishes compact, dependable, easily-managed, flexible power, taking the place of 30 horses or mules and operating at a much lower cost. Besides, the Best will do a great deal of work which horses cannot perform.

Another advantage in favor of the Best Sixty for road work is its ability to negotiate ground too soft for animals and too rough for trucks. The long, wide tracks distribute the weight over so great an area that the ground pressure per square inch is less than that of the average-sized man. The tracks also bridge ruts and holes and gaps, enabling the Best to work efficiently under very unfavorable ground conditions.

There are many mechanical features of the Best that are responsible for Best performance. This tractor is the result of a development covering many years of tractor-building experience. Design, choice of materials, engine, workmanship—all have been time-tested and proven in actual practice. For years the Best has been conspicuously successful on the big heavy-duty work of the West.

Our catalog fully explains these mechanical features and their time-tested advantages. Write for it. Also ask for the name of our nearest dealer.

C. L. Best Tractor Co.

San Leandro

California



BEST

TRACKLAYER

TRACTORS

making the city a safer and at the same time a better city in which to live.

HARRY J. BELL,
Secretary, The Chicago Safety Council, Chicago
Association of Commerce.

Chamber Aids Firemen and Policemen

SIoux CITY, IOWA.—The December issue of THE AMERICAN CITY carried a story about the manner in which the Sioux City Chamber of Commerce secured higher pay for the employes of the local traction company. The story that follows relates to a similar activity, that of securing an increase in the wages of the city's policemen and firemen, who were leaving their positions for positions elsewhere offering higher remuneration. The increase in the cost of living found the men unable to finance their affairs on the inadequate wage they were receiving, and an appeal to the city for more pay revealed the fact that no funds would be available for such a purpose until in April, 1921, when additional revenue would be coming into the city treasury. The matter could not be postponed, however. The city's safety was at stake and immediate action was imperative if efficient police and fire departments were to be maintained.

The critical situation which had arisen was brought to the attention of the Chamber of Commerce, which immediately appointed a committee to make a thorough investigation of all the conditions and report to the Board of Directors with recommendations. This committee appeared before the City Council and satisfied itself that the city's finances would not permit the granting of higher salaries to the men in question before the date mentioned. The committee next investigated the living conditions of the men themselves and found them to be seriously in need of more money than they were receiving.

Having satisfied themselves that the policemen and firemen were entitled to better wages than the city could provide, the members of the committee suggested to the Board of Directors of the Chamber that there be raised among the business men a fund from which the salaries the men were at that time receiving could be augmented until the city could take care of the matter. The suggestion was adopted, and soon thereafter pledges aggregating \$40,000 were

secured from the local business establishments, which willingly pledged themselves to pay into the fund, known as the Firemen's and Policemen's Service Fund, a certain sum monthly until April of 1921. Thus each man was provided with an additional \$25 a month, which they receive simultaneously with their regular pay from the city. This made the men much more contented, and the city is consequently safer.

The work of the Chamber of Commerce in this instance has brought about a much closer relationship between the city's guardians and the business men. The fund is being administered jointly by the Chamber of Commerce and the city's Commissioner of Public Safety.

WILLIAM HOLDEN,
General Secretary, Sioux City Chamber of Commerce.

Findlay's Fire Prevention Campaign

FINDLAY, OHIO.—The complete reorganization of the Fire Department and the installation of motorized fire-fighting equipment is assured the city of Findlay as a result of the activities of the local Chamber of Commerce. The committee which has been working on the problem found that the department was years behind the times in its internal organization and that the Fire Chief lacked the requisite authority to enable him to improve the conditions.

The first step in the campaign waged by the Chamber of Commerce in its effort to get the City Council to purchase up-to-date apparatus and reorganize the department was to arouse the interest of the public in the subject. This was done during Fire Prevention Week, conducted by the Chamber of Commerce during the week of October 18, 1920. During this period the interest of the public schools was especially enlisted. Home inspection blanks were distributed among the pupils in an effort to eliminate the fire hazards; 1,500 of these were filled out by the children, who were also asked to write essays on fire prevention.

Both the Kiwanis and Rotary Clubs cooperated actively to make Fire Prevention Week a success. A forceful speaker was brought from New York to address an open forum meeting held by the Chamber of Commerce for the purpose of discussing the subject of fire prevention. The services of fifty state inspectors of fire hazards were

The City Beautiful

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Power spraying will do more towards beautiful parks and streets than other methods.



Spray with the **Bean Power Sprayers** and reduce the cost of maintenance.

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The NATION'S Road Maker

Power is the problem of the road builder. From the clearing of the right of way to the completed road every operation depends upon the power equipment.

Road officials and contractors everywhere use "Caterpillar" Tractors because the "Caterpillar" has proved dependable, thru years of service, for the whole range of power needs in modern road making and maintenance.

Flexible roller frame construction (exclusive Holt feature), three speeds, positive traction, convenience of operation, accessibility of all parts—these and many other features combine to make the "Caterpillar" the most practical power for the road maker.

Booklet, "The Nation's Road Maker" on request.

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PEORIA, ILLINOIS

Spokane, Wash. New York Office, 50 Church St. Factories at Stockton, Cal., and Peoria, Ill.



Doing the Work of 32 Mules for Sumpter County, Ga.

Sumpter County, Georgia, operates three "Caterpillar" Tractors.

"We are keeping a cost account and our savings are based on this record. In grading, the daily saving with two 'Caterpillars' is \$91.02 over our former cost with mules. In maintenance we drag 30 miles per day at a saving of \$1.32 per mile over former costs."

There is but one

CATERPILLAR

—HOLT builds it.

also secured, and approximately 300 special inspections were made by them.

All these activities revealed conditions which convinced the members of the City Council of the necessity for making the improvements in the Fire Department urged by the Chamber of Commerce. An ordinance giving the Fire Department extensive powers was subsequently presented to the Council and favorably acted upon by it; and the Council has assured the Chamber that it will support the detailed recommendations for improvement that are finally made. Two experts were appointed to make an intensive study of the department, and after they have completed their work it is expected that a top-notch fire chief will be brought to Findlay to organize and train the local force.

J. B. ABELL,
Managing Secretary, Findlay Chamber of Commerce.

Farmers Shown Advantages of Motor Trucks

PORTSMOUTH, OHIO.—The fine spirit of coöperation which characterizes all the activities of the Portsmouth Chamber of Commerce was again exemplified in the "motor truck on the farm" tour which was conducted recently by that organization. Practically all the truck dealers in Portsmouth participated in this tour, and the only two who did not remained out because of their inability to procure trucks in time.

A "motorcade" (you cannot say "cavalcade" when speaking of automobiles!), consisting of a Buick coupelet, a Chevrolet suburban car, a Chevrolet 2-ton truck, a Nash 1-ton truck, a Nash 2-ton truck, a White 2-ton truck, a Stewart 2-ton truck, a GMC 1-ton truck, a GMC 2-ton truck, and an Overland service wagon, left the Portsmouth Chamber of Commerce on a Tuesday morning and were on the road until Saturday noon of that week. They covered five counties and a distance of over 400 miles. Two weeks before the tour took place an advance agent distributed large posters over the territory to be covered, and announced the time when the cars would arrive at each country town. Another man was designated to reach the town one hour before the arrival of the automobiles and perfect the arrangements for the exhibit.

An Alamo lighting system was set up on one of the GMC trucks, and at night the entire line of cars was illuminated by wire

stretched over the trucks. Music was provided by the use of a piano mounted on one of the trucks, and by a cornetist, a saxophone player and a trap drummer who accompanied the party.

At each stop in the village short talks were given on "Motor Trucks on the Farm," after which the cars proceeded to a farmer's field which had previously been selected for the exhibit, where a demonstration was given on hauling manure spreaders, hauling in hay, pulling hay-cutters and pulling wheat binders. Cards giving the names of all the trucks in the exhibit were distributed at each town, with the request that any one interested in any particular type check that make on the card and send it, with his name and address, to the Portsmouth Chamber of Commerce, which would send full information about the car from the dealers.

The tour was in no sense a sales effort, but was intended to bring to the farmers' attention by actual demonstration the advantages to be gained from the use of such labor-saving equipment. No literature was distributed and no effort was made to sell cars, thereby placing all the dealers on an equal footing.

The success of the tour was much greater than the Chamber anticipated. In all the small towns visited, large crowds of farmers gathered to examine the trucks and to listen to the talks. The music rendered by the small orchestra which accompanied the party was also appreciated, and in every way the tour more than justified the time and expense connected with it. Each automobile dealer contributed \$50 towards the general expense, and they all felt that the tour was the best advertising in which they had ever invested.

J. B. WILES,
Formerly Manager, Portsmouth Chamber of Commerce.

Chamber Helps to Finance Water Conservation Project

SAN JOSÉ, CALIF.—Valuable assistance has been rendered the ranchers and fruit-growers of this section by the San José Chamber of Commerce through its assistance in financing a water survey preliminary to establishing irrigation districts and reservoirs in the mountains near-by, where the surplus water which accumulates during the winter and spring months may be held for use as needed.

The orchards in the Santa Clara valley

THE AMERICAN CITY

PACKARD



Prompt Bus Service Pays Dividends

If passenger-carrying busses are to be operated at a profit, they must maintain schedules, regardless of weather and road conditions.

Because Packard trucks have a known reputation for dependability, combined with low hauling and repair costs, the New Jersey Auto Bus Association, of Newark, N. J., purchased a fleet of Packard trucks and fitted them with specially designed bodies, each of them capable of carrying fifty passengers.

These busses, which develop fifty horsepower and roll day in, day out,

at speeds up to 28 miles an hour, serve the public with safety, dispatch and comfort, and without the annoying waits and delays that invariably lead to lost patronage.

Because of this excellent service, these busses, in turn, pay their owners a maximum return on their investment.

They perform as Packard trucks habitually perform—crowding more work into each day at a lower cost—because they are correctly designed, precisely built, and scientifically specified to the job.

PACKARD MOTOR CAR COMPANY • DETROIT

Ask the man who owns one

produce from \$40,000,000 to \$50,000,000 worth of cherries, apricots, prunes, peaches, pears, plums, apples and other fruits every year, and require an abundance of irrigation, but with no irrigation districts or reservoirs in which to hold the winter waters, the majority of this natural water-supply runs down the streams in swift torrents and empties into San Francisco Bay. The orchard acreage is increasing yearly, and it was found that the thousands of irrigation wells by which they are maintained were steadily lowering the underground water-level. The fruit-growers last spring therefore began to look around for ways and means of establishing irrigation districts and reservoirs in the surrounding mountains in which the tremendous volume of water that goes to waste during the winter and spring months could be conserved.

It was necessary first of all to have a survey made of the district, and this, it was estimated, would cost \$20,000. The horticulturists appealed to the Chamber of Commerce for assistance in raising this sum. The Chamber found that the County Board of Supervisors was able to appropriate only \$5,000 toward such a fund. This amount the Chamber agreed to augment by undertaking to raise \$7,500, if the fruit-growers would produce a similar amount, thus completing the required total of \$20,000.

Dues Credited to Funds

The Chamber launched a campaign for new members, and announced that every dollar received for new memberships during the months of May, June and July would be placed in the water survey fund. The campaign committee secured the coöperation of the Rotary Club, the 100 Per Cent Club, the Lions Club, the Progressive Business Men's Club, the Merchants' Association, and the Santa Clara County Automobile Association, among which competing teams were organized. Manager Roscoe D. Wyatt, of the Chamber, prepared the prospect list.

Reports were made at the luncheon meetings held daily during the campaign, and the Chamber of Commerce was soon able to tell the fruit-growers that it had gone over the top in raising its share, its campaign producing more than \$8,000. The fruit-growers also exceeded their quota, and incidentally added many of their number to the Chamber's membership.

Since its reorganization a little over a year ago by the American City Bureau, the San José Chamber of Commerce has accomplished much that is worth while, but this activity stands out perhaps more prominently than any other because of the fine spirit of coöperation which the campaign engendered among the agricultural and horticultural interests throughout the entire valley. The Chamber feels that the financial assistance rendered, while great, is the least substantial result of the undertaking, and that the cordial and helpful relations that were established constitute a more lasting result, which cannot fail to be a valuable factor in the progress of the community.

V. J. LaMOTTE,

President, San José Chamber of Commerce.

Civic Activities Portrayed in Pageant

PITTSBURGH, PA.—A very interesting and illuminating pageant was given in Pittsburgh on December 8 by the Civic Club of Allegheny County as the crowning event of twenty-five years of effort for civic betterment. In it were depicted the problems with which the Club has been confronted during that period and the progress that has been made toward their solution.

The actual presentation of the pageant was preceded by a short program of music on the new organ in Carnegie Hall, and an address by Herbert Adams Gibbons on "Opportunities and Responsibilities for Americanism."

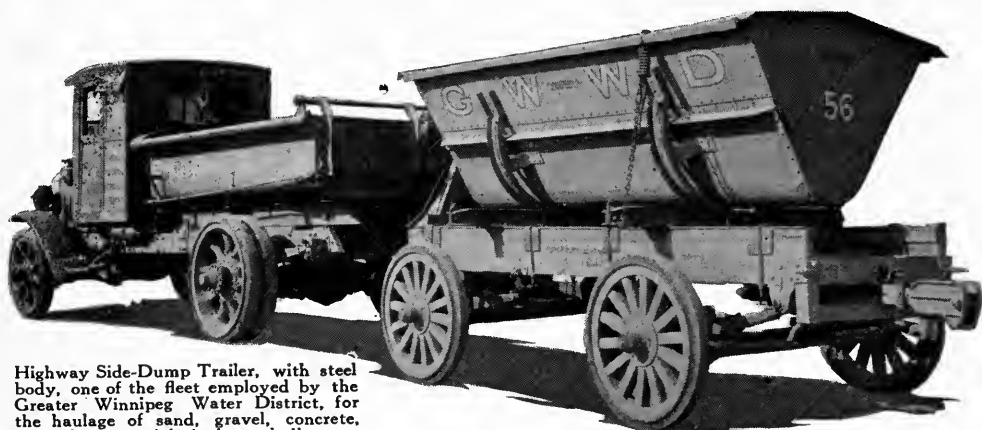
In the opening scene of the pageant the Spirit of the City was shown as a great, powerful blacksmith, seated on a throne, and sleeping, shackled by chains of gold and custom. Below his throne sat his evil counsellors, Worldly Power, Greed, Pride and Complacency, impersonated by four men; and below them, in the outer darkness, groups of individuals representing the victims of those evils against which the Civic Club has struggled. The time was that of the inception of the Civic Club twenty-five years ago. Civic Spirit, denoting service, next appeared, and in a prologue related her problems and purposes, and then the action began.

The evil counsellors agreed upon the appointment of Worldly Power (Self) to represent them. While they were deliberating, Civic Spirit descended to the groups below and touched one after another of the vic-

HIGHWAY TRAILER

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WISCONSIN

The Largest Trailer Plant in the World



Highway Side-Dump Trailer, with steel body, one of the fleet employed by the Greater Winnipeg Water District, for the haulage of sand, gravel, concrete, and other materials in loose bulk.

Note Price Advantage of Highway Trailers

Costs \$200 to \$600 Less Than Average Trailers



Note how completely the automatic dump empties the carrier. Also observe that the load is pitched entirely clear of the wheels.

The exclusive advantages which distinguish Highway Trailers are a much greater factor in the wide preference they enjoy, in all sorts of transportation, than even the big price saving they effect.

The steel-body, side-dump trailer, shown in the illustrations was specially designed for road and street building, and the practical elimination of slow, costly hand-shoveling in loading and unloading.

The release of a lock automatically pitches the load clear of the wheels in the desired direction. One man easily returns the body to the upright position.

There is also the steel-body, two-way, side-dump trailer with drop-frame, similar in appearance, but lower, which operates in almost precisely the same manner, and which is chosen by many contractors and road engineers because of the drop-frame feature.

Write for literature and any special information required

The Highway Trailer Co.,

Edgerton, Wis.

tims of the evils referred to—Joyless Childhood, the Unclean, the Plague-Stricken, Youth in Idleness, the Disinherited, and the Unprosperous, questioning each. Worldly Power (impersonated by a man) reproved her for her inquiries. She tried to awaken the Spirit of the City (the Smith). He did not hear her. And so, having found plenty of work to do, she called to her aid the four branches of the Club's activity—Government, Social Science, Education, and Art, which were impersonated by four women. With the help of these she started out upon her mission of reform.

The Club's activities during the twenty-five years' period were next portrayed. For the Unclean a pure water-supply was obtained and public baths opened. For Childhood, playgrounds, the Juvenile Court, the open air schools, the child labor law, etc., were attained. For Youth, the recreation program and new educational opportunities in the night schools were made available. For the Plague-Stricken, the tuberculosis campaign, the Municipal Hospital, various forms of health legislation, the tenement law, and the new sanitary code, were achieved. Then followed legal aid and Associated Charities, city planning and the organization of citizenship and Americanization campaigns. As these movements proceeded, the chains gradually fell from the Smith and he awoke.

A grand festival then took place in celebration of the anniversary of the Civic Spirit's organized effort. It was a festival of rejoicing, to which all who had participated in the work, and all good citizens as well, were invited. During this festival the long silent Smith spoke at last. He rejoiced with the rest, but he solemnly warned the Civic Spirit and her ministers not to pause midway in their task, but to proceed with their never-ceasing struggle for the better day, the city of the future that is to be.

Thomas Wood Stevens, Director of Dramatic Art of the Carnegie Institute of Technology, was the author of the pageant and rehearsed its production. The cast was made up of "Tech" dramatic and music students, the Guild Players, public school children, foreign-born citizens of twelve nationalities, and 25 young society girls who represented candle spirits, one for each year of the Civic Club's existence.

(MISS) H. M. DERMITT,
Secretary, Civic Club of Allegheny County.

BUY NOW

BUY NOW

All Strikes End Sooner or Later

The reason we were able to finance the War so well is that business was good—people bought and sold. The only way we can PAY for the war is by buying and selling—trading.

If you are on a buying strike—"forget it."

If you won't buy the things the other fellow makes or handles HE can't buy the things YOU make or handle. That is reasonable, is it not? Those who are insistently determined to put off the buying of the things they need are not doing humanity a service, they are helping to clog the wheels of commerce and industry which will cause dire results.

Your livelihood and prosperity are bound up in the livelihood and prosperity of other men—you can't deny that point. There is nothing fundamentally wrong with this country—there are bountiful crops, ample money, capable heads and hands. Business is a gigantic organization kept alive and active by trade coursing through its veins. When trade stops circulating—business dies. No man's trade can flourish in splendid isolation. You can't sell the articles you make or handle to the man "out of a job" or the industry whose wheels are stopped.

True thrift is always wise, but if the public refuses to buy the things they need NOW they are stopping up the channels that feed and clothe us ALL.

Go out and buy to-day the things you need, for the prices ARE down. They went up a step at a time and they can't come down the bannister. If you wait for the "bottom to drop out" neither you nor the other fellow may be able to buy then.

**THINK and BUY the THINGS
you NEED now**

Winston-Salem Chamber of Commerce

This is One of a Series of Advertisements Being Published in the Daily Newspapers of Winston-Salem by the Chamber of Commerce in an Effort to Do Its Share to Stimulate Buying and Stabilize Business.

“Simplex”

HEATING and MIXING PLANT

for laying and repairing bituminous macadam and asphalt pavements Solves the need of municipalities, counties, state highway departments and paving and road building contractors for a sturdily built, easily portable $\frac{3}{4}$ -yard plant which combines all the necessary requirements either for laying new pavements or keeping streets and roads in repair. The mixing is so thorough that every batch is a *perfect* batch. The weight of the machine is approximately 15,000 pounds and it may be readily drawn by tractor, road roller or horses.

MUNICIPALITIES

already owning stationary asphalt plants will find the “Simplex” single unit plant a tremendous money saver for all work not requiring the full capacity of the large plant and utilizing the old asphalt which can be successfully worked into pavements by the use of the “Simplex” machine. Cities and Villages as yet unsupplied with a paving plant will find in the “Simplex” a means of reducing their paving and maintenance expense to the minimum consistent with good work.

For full particulars apply to

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Room 1762, 50 Church St., New York City

The City's Legal Rights and Duties

**Information for City Attorneys and Other Municipal Officers, Summarizing
Important Court Decisions and Legislation**

Conducted by A. L. H. Street, Attorney at Law

Gas Tank Ordinance Void Which Makes Issuance of Permit an Arbitrary Power

City of New Orleans Ordinance No. 2126, amended by Ordinance 5453, requiring a permit for the operation of a portable gas tank on a city street, without prescribing any terms or conditions on compliance with which a permit shall be granted, or without which it shall be withheld, purports to confer arbitrary power to grant permission to conduct a legitimate business to one person and withhold it from another in a like situation, and is therefore void. (Louisiana Supreme Court, *City of New Orleans vs. Palmisano*, 83 Southern Reporter, 789.)

Vested Right of Policeman to Pension and Place Under San Francisco Charter

Under the San Francisco charter a police officer placed on the retired list and regularly granted a pension on proof of disabilities has a vested right to retain his place on the retired list and to have his pension continued until his disabilities cease. (California District Court of Appeal, *Sheehan vs. Board of Police Commissioners*, 190 Pacific Reporter, 51.)

Railroad Company's Right of Way Cannot Ordinarily Be Assessed for Local Improvements

A railway company's land is not subject to street improvement where such land is a part of its right of way used exclusively in operating its train service and there is no showing it would ever be used for any other purpose.

In reaching this conclusion in the case of *Johnston City vs. Chicago & Eastern Illinois Railroad Company*, 124 Northeastern Reporter, 568, the Illinois Supreme Court said:

"There are unusual conditions under which a railroad right of way can be said to be bene-

ficial by a local improvement, but as a general rule it cannot be. The limit of an assessment for benefits resulting from paving a street is the enhanced value of the property, and where its use is restricted to the running of trains there can be no assessment unless the value is increased for that use. Where the property is restricted by statute or grant to a particular use, and cannot be legally applied to any other use, and is at the time of the improvement devoted to such particular use, the true measure of the benefit which the improvement will confer is the increased value for the restricted use, in the absence of proof reasonably tending to show that the property in question, having regard to present conditions and the existing business and wants of the public, is about to be devoted to other uses.

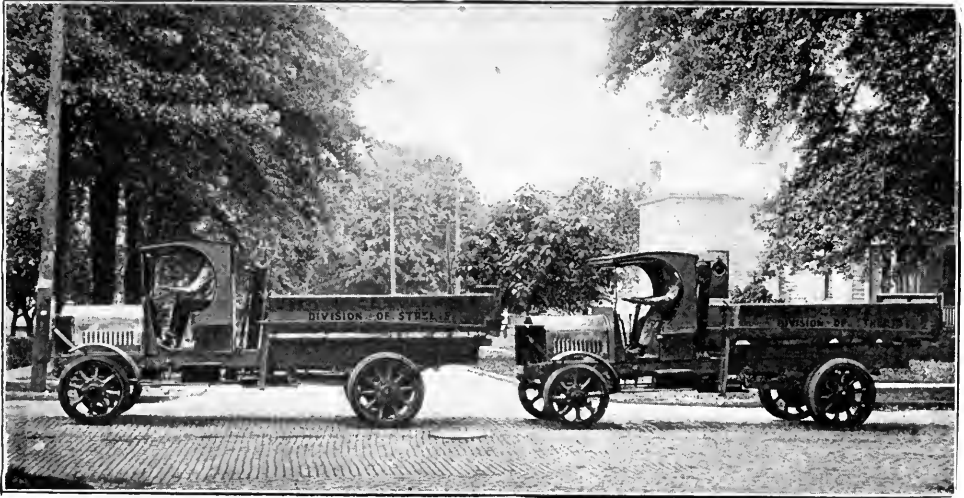
"In this state, however, it is a settled rule that the property of a railroad corporation, even though used for railroad purposes, if benefited, may be assessed for a local improvement. But an increase in freight traffic and the general business of appellant cannot be considered in assessing benefits to its right of way."

Owner of Land Benefited by Improvement Not Personally Liable for Assessment

Under a statute providing for payment for a local improvement by special assessment against benefited property, the land alone is liable; if that is insufficient to pay the assessment, resort cannot be had against the owner personally for payment of the balance. (North Carolina Supreme Court, *Town of Morgantown vs. Avery*, 103 Atlantic Reporter, 138.)

Charter Provision Impliedly Repealed by General Statute

Provision in a municipal charter requiring a two-thirds vote of electors before a bonding limit can be raised is impliedly repealed by a general statute subsequently enacted authorizing cities to raise such limit by a three-fifths vote. (Michigan Supreme Court, *City Commission of Jackson vs. Veder*, 176 Northwestern Reporter, 557.)



TIFFIN TRUCKS AND FLUSHERS

Service for Road and Street Maintenance

The road contractor must consider the splendid record of Tiffin Dump Trucks and Dump Wagons.

The city engineer must take note of the excellent perform-

ance of Tiffin Street Flushers throughout the country.

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Liability of City on Local Improvement Bonds Considered a Debt in Ascertaining Constitutional Debt Limit

Under the provisions of the Kentucky constitution limiting the debt limit of cities, contracts for local improvements to be paid for wholly by special assessments against benefited property are not to be regarded as creating municipal indebtedness. But if the city becomes a guarantor of the payment of principal and interest on local improvement bonds, and not merely a collector of the special assessments for the benefit of the holders of the bonds, then the debt evidenced by the bonds is to be counted in ascertaining whether the constitutional debt limit is being exceeded. (Kentucky Court of Appeals, *Castle vs. City of Louisa*, 219 Southwestern Reporter, 439.)

Municipality Not Liable for Flooding from Sewer Where Owner Could Have Prevented Damage—Court May Require Sewer to Be Properly Constructed

Applying the general rule that one may not recover damages for an injury caused by the negligence of another when such injury readily could have been avoided by the use of ordinary care on the part of the injured person, the New York Supreme Court holds in the case of *William P. Greiner Building Corporation vs. Town of Cheektowaga*, 181 New York Supplement, 759, that a municipality is not liable for damage resulting from backing up of a sewer and flooding of cellars where the damage easily could have been prevented by the property owners or occupants by using caps on drains on their premises, although the town may have been negligent in respect to maintenance of the sewer in its particular condition.

The Court also holds that a municipality is not liable for mere errors of judgment in making such public improvements as streets, sewers, etc., but that this rule could not operate to relieve defendant town from liability for negligence in permitting surface waters to enter and overtax a sewer which was adequate only for the purpose of caring for house drainage. It was further decided that where a town constructed a house drainage sewer so that at flood times surface waters entered it, overtaxed it, and flooded cellars of property drained, the owner of

such property is entitled to mandatory injunction requiring the town to cover or reconstruct manholes sufficiently to exclude surface waters, although owner is not entitled to damages on account of his own failure to cap drains in cellars and thus prevent flooding.

Ordinance Requiring Consent of Adjoining Landowner Before Issuance of Permit to Erect Public Garage, Held Invalid

An ordinance of the city of Wilmington, Del., declaring that no permit shall be granted by the building inspector for the erection of a public garage in the residential portion of the city within 40 feet of adjoining land without the consent of the owners of such land, is invalid.

In reaching the above-stated conclusion, the Chancellor of the Court of Chancery of Delaware recently said in the case of *Myers vs. Fortunato*, 188 Atlantic Reporter, 678:

"It seems to me clear that private persons to whom as owners of land is given the power to control the use by the owners of adjoining land of their property are presumably governed by self-interest, and are more apt than an official to be arbitrary and unjust when their own interests are affected. Obviously, then, decisions which uphold the validity of an ordinance giving to a single official arbitrary power to make effective an ordinance do not apply to legislation which gives such power to private persons when control is thereby given them over the use of land or other private persons."

Construction of Missouri Constitution as to One Person's Holding More Than One Office

The clause of the Missouri constitution providing that in cities or counties with more than 200,000 inhabitants no person at the same time shall be state officer and officer of any county, city, or other municipality, and that no person shall fill two offices either in same or different municipalities, applies as a whole only in counties and cities having more than 200,000 inhabitants; so that the marshal of a city of the fourth class could also and at the same time hold the office of constable of the township in which the city was situated. (*Missouri Supreme Court, Nickelson vs. City of Hardin*, 221 Southwestern Reporter, 358.)

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Ordinance for Licensing Lodging-Houses Held Valid

An ordinance forbidding the operation of lodging-houses wherein sleeping quarters for three or more persons are provided without payment of a license tax or securing a permit, is not invalid as being unreasonable and discriminatory. (*Missouri Supreme Court, City of St. Louis vs. Murta*, 22 *Southwestern Reporter*, 430.)

Wooden Building Erected Within Fire Limits in Violation of Ordinance May Be Ordered Demolished

Where a wooden building was erected within the fire limits of a city, in violation of an existing ordinance, it could be ordered demolished by the municipal authorities on refusal of the owner to raze it, although the ordinance under which the building is so condemned was adopted after the structure was erected, holds the California District Court of Appeal in the San Francisco case of *Maguire vs. Reardon*, 183 *Pacific Reporter*, 303.

It is further decided that the fact that the Board of Public Works of the city may have issued a permit for construction of the building could not preclude the city from enforcing condemnation of the building. And it is held that even if the ordinance providing for demolition of buildings maintained in violation of the fire ordinance should be unconstitutional, a court would not lend its equity power to perpetuate the nuisance constituted by erecting a frame building within the fire limits in violation of the fire ordinance, by enjoining enforcement of the invalid ordinance.

Right of City to Prescribe Patented Material Under Competitive Bidding Contract

"While there is some conflict of authority upon the question of the right of the officers of a municipality to prescribe a patented material for street paving under a statute or charter requiring competitive bidding, the great weight of the more recent authorities is in favor of such right, where the owner of the patent does not himself bid for the contract, but makes an offer to furnish the patented material or mixture for a stipulated price, on equal terms to all bidders." (*Tennessee Supreme Court, Burns vs. City of Nashville*, 221 *Southwestern Reporter*, 828.)

Charter Provision Empowering City to Regulate Use of Streets and Public Grounds is Authority for Ordinance Requiring Permit for Parade

Municipal authorities who are active toward the adoption of measures intended to prevent seditious and disloyal meetings and demonstrations in public will be interested in the decision of the Appellate Division of the New York Supreme Court in the case of *City of Buffalo vs. Till*, 182 *New York Supplement*, 418.

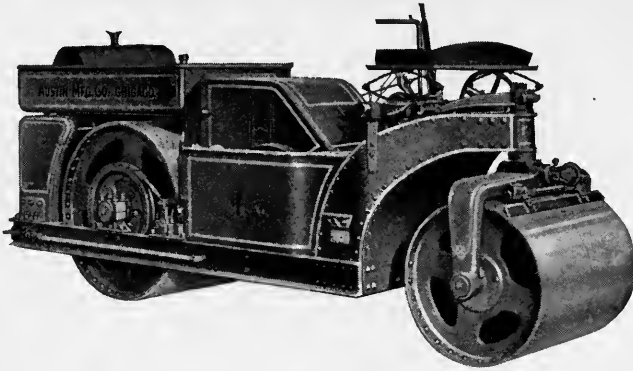
Defendant appealed from a judgment fining him \$50 for violation of an ordinance of plaintiff city containing the following provision:

"No person shall participate in any parade, gathering, assemblage or demonstration upon any street, square, park or other place within the city to which the public are invited or have access, which parade, gathering, assemblage or demonstration has not been authorized by a written permit from the mayor."

Grounds upon which defendant unsuccessfully sought to secure a reversal of his conviction included a contention that the Buffalo charter did not authorize the adoption of such an ordinance. But the Court found that such authority amply existed in clauses of the charter empowering the city to enact ordinances "to define and prevent disorderly conduct; to prevent all disorderly assemblages;" "to regulate the use of streets, alleys, wharves and public grounds, and to declare in what manner and for what purpose they shall not be used;" "and such other and further ordinances not inconsistent with the laws of the state, as shall be deemed expedient for the good government of the city, the protection of its property, the preservation of peace and good order, etc."

Either Consumer or Village May Maintain Action to Enforce Gas Franchise Rates

Provision in the franchise of a gas company that it should not charge consumers in a village more than \$1.40 per 1,000 cubic feet, constituted a contract for the benefit of consumers, on which either the village or any consumer might maintain action for enforcement. (*New York Supreme Court, Village of Freeport vs. Nassau & Suffolk Lighting Company*, 181 *New York Supplement*, 830.)



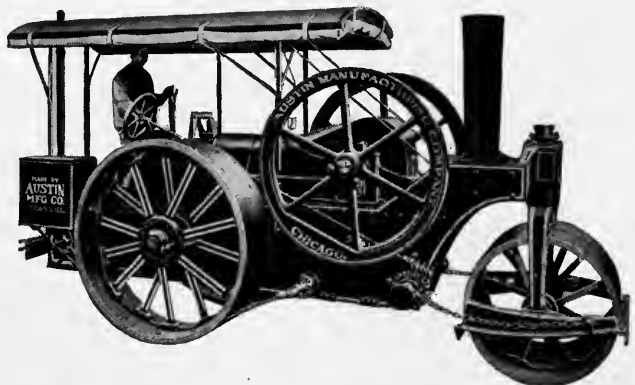
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Municipal and Civic Publications

THE ROMANCE OF OUR TREES.

Ernest H. Wilson, Assistant Director, Arnold Arboretum, Harvard University. Doubleday, Page & Company, New York. 1920. XVI + 278 pp. Illustrated.

A most readable and instructive volume for all who would know more of the history of the trees of our country. The opening chapters tell of the intimate association of trees and mankind from the earliest times. The book is written in non-technical language and in a manner which is readily understood by the uninitiated. The remarkable geographical distribution of trees influenced by the geological eras, notably the glacial epoch, wherein species known on one continent appear in local areas on another, is outlined. The relationships of the trunks of trees and their autumn splendors are described in interesting detail.

The stories of trees which have meant much in history and which are well known to the average reader are told in detail, particularly those of the ginkgo, the cedar of Lebanon, the common yew, the horse-chestnut, the magnolia, and the European beech. Following these are discussions of our nut trees, which have been urged so generally as sources of revenue to governmental units when used as shade trees along our streets. Our common fruit trees, as well as the Lombardy poplar and the willow of Babylon, are accorded chapters of their own. The closing chapters contrast the tall and stately trees and those which grow only as pigmies.

RECREATION.

Three pamphlets, reprinted from "The Playground": "Recreation as a Function of the Church," "Folk Dancing as Social Recreation for Adults," by Elizabeth Burchenal; "What We Did on a Summer Playground in Chicago," by Genevieve Turner Holman. The third contains suggestions for activities on any small children's playground. Published by the Playground and Recreation Association of America, 1 Madison Avenue, New York City. (Apply to publishers.)

ACCIDENT PREVENTION.

"A Course of Study in Safety Education." By Harriet E. Beard, Supervising Instructor of Safety Education, Detroit Teachers' College. 1920. 31 pp. An article by the author in the department of "Forward Steps," in this issue of The American City describes this course and its application in the Detroit Public Schools. (Apply to author.)

MILK SUPPLY.

"Pasteurization of Milk." Report of the Committee on Milk Supply of the Sanitary Engineering Section of the American Public Health Association. 32 pp. 1920. The report contains up-to-date information on the effect of pasteurization on the composition of milk, the process of milk pasteurization, the analytical control of pasteurization plants and state and municipal supervision of the pasteurization of milk. (Apply to A. W. Hedrich, Secretary of the Association, 169 Massachusetts Ave., Boston, Mass.)

DOMESTIC SANITARY ENGINEERING AND PLUMBING.

F. W. Raynes, Longmans, Green & Company, New York. 1920. XIII + 476 pp. Tables, diagrams and illustrations.

An interesting book from the English technical press covering the subject as stated in the title and devoting little space to the municipal side of sanitary engineering. It covers the subjects of roof work, pipe fixing and pipe bending, pipe joints, solder, fluxes and lead burning, sanitary fittings and accessories, soil and waste pipes, drainage of houses and other buildings, disposal and treatment of sewage from mansions and houses in country districts, water-supply, appliances for raising water, hydrostatics and hydraulics, domestic hot-water supply, and low-pressure hot-water heating systems, and includes an appendix containing handy tables. Specific instances of house problems are worked out in the text.

INSTRUCTION IN AMERICANIZATION.

"Training Teachers for Americanization." A course of study for normal schools and teachers' institutes, by John J. Mahoney, State Supervisor of Americanization for Massachusetts, with a chapter on Industrial Classes, by Frances K. Wetmore, of the Public Schools of Chicago, and on Home and Neighborhood Classes, by Helen Winkler and Elsa Alsberg, of the Council of Jewish Women. Published as Bulletin. 1920, No. 12, by the Department of the Interior, Bureau of Education. 62 pp. (Apply to the Bureau of Education, Department of the Interior, Washington, D. C.)

THE PROBLEM OF AMERICANIZATION.

Peter Roberts, Ph.D. The Macmillan Company, New York. 1920. vii + 246 pp.

The author of this book has been director of the Americanization activity of the Y. M. C. A., and for fifteen years has been in intimate contact with immigrants in every state in the Union. The purpose of the book is to aid men and women giving all or part time to Americanization work; it submits a definite program and plan of operation, and outlines methods by which men and women may be trained for this work.

OLD VILLAGE LIFE.

Or "Glimpses of Village Life Through All Ages." By P. H. Ditchfield, F. R. Hist. S. E. P. Dutton & Company, New York. 1920. xii + 253 pp. Illustrated.

This volume traces the development of village life in England from prehistoric times down to the present. There is a wealth of quaint antiquarian information and numerous interesting illustrations.

FLYING GUIDE AND LOG BOOK.

Bruce Elytne, Hon. Lt., Royal Air Force-Pilot, Capt. Aerial Police Reserve, N. Y. C., Member Aero Club of America. Foreword by H. M. Hickam, Maj. Air Service. John Wiley & Sons, Inc., New York. 1921. 150 pp.

A useful hand-book for the amateur or commercial flyer. It gives practical general suggestions, suggestions for laying out landing fields, lists of landing fields in the United States, with details of routes for cross-country flying, and several pages of hints on "trouble shooting" for aeroplane engines. A number of pages have been prepared to be used as a "log" of flights.

FIELD WORK AND SOCIAL RESEARCH.

F. Stuart Chapin, Ph.D., Professor of Economics and Sociology, Smith College. The Century Company, New York. 1920. xi + 224 pp. Charts and diagrams.

This book gathers together the well-tested methods and techniques of social investigation and presents them in an accurate and practical form. The material is so arranged that the reader can readily find the detail of technique in which he is especially interested. Actual field work investigations of many different kinds are described in detail, and the theoretic principles underlying procedure are so stated that the practice may be examined in the light of well-established methods.

NEW YORK CITY.

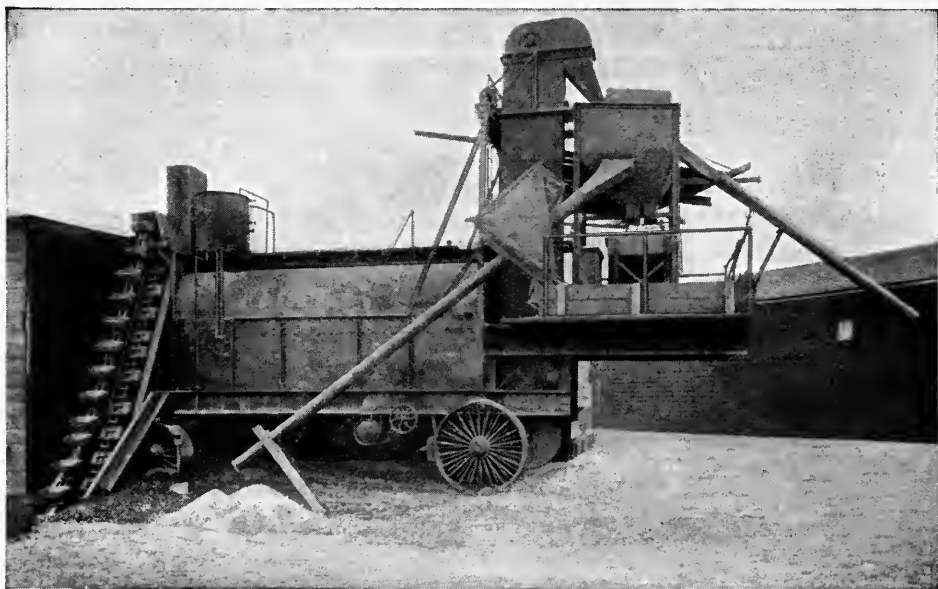
"The Metropolis," Alexander Otis, Editor. Published by the Metropolis Publishing Company, Inc., 318-326 West 39th Street, New York. Vol. I., No. 1. January 1, 1921. Published semi-monthly. A magazine devoted to the interests of the city of New York.

CITY PROBLEMS.

"City Problems": the Proceedings of the Eleventh Annual Meeting of the Conference of Mayors and other City Officials of New York State. 146 pp. 1920. (Apply to William P. Capes, Secretary of the Conference, Albany, N. Y.)

LABOR.

"American Minimum Wage Laws at Work," by Dorothy W. Douglass. 41 pp. 1920. A detailed description of the operation of minimum wage laws in the various states. (Apply to The National Consumers' League, 44 East 23rd Street, New York, N. Y.)



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PHILADELPHIA

CITY PLANNING.

"Municipal Accomplishment in City Planning and Published City Plan Reports in the United States." Edited by Theodora Kimball, Librarian, School of Landscape Architecture, Harvard University, from information assembled largely by the Detroit City Plan Commission. Published under the auspices of the Na-

tional Conference on City Planning. 79 pp. 1920. This bulletin was prepared from questionnaires sent to about one hundred cities where planning work in the last twenty years has been represented in published reports. It shows in a striking fashion the character and intensity of municipal activity in city planning at the present time. (Apply to the National Conference on City Planning, 60 State St., Boston, Mass.)

The publications listed above are for sale by their publishers. Those listed below are understood to be free upon application.

MILK SUPPLY.

"Standard Methods for the Bacteriological Examination of Milk." Third edition. 24 pp. 1921. Published by the American Public Health Association. (Apply to the American Public Health Association, 169 Massachusetts Avenue, Boston, Mass.)

MALARIA.

"A Study of the Malarial Mosquitos of Southern Illinois. I. Operations of 1918 and 1919." By Stewart C. Chandler. Maps and illustrations. 1920. Issued as Article XI. of Vol. XIII., by the Illinois State Department of Registration and Education, Division of Natural History Survey, Urbana, Ill. (Apply to Stephen A. Forbes, Chief.)

COMFORT AND SHELTER STATIONS.

"Common Sense and a Public Need." An argument for the installation of comfort stations in Newark, N. J. By Arthur J. Smart. 8 pp. Illustrated. (Apply to author, 48 Hartford Street, Newark, N. J.)

REGINA, SASKATCHEWAN.

An illustrated booklet descriptive of Regina and its vicinity. Issued with the compliments of the Mayor and Aldermen of the City of Regina and of the Members of the Board of Trade. (Apply to Board of Trade, Regina, Saskatchewan.)

RECREATION.

Publications of the Playground and Recreation Association of America. A bibliography. 18 pp. (Apply to the Playground and Recreation Association of America, 1 Madison Avenue, New York City, N. Y.)

HEALTH.

"The Economics of Health," by Ira S. Wile, M.D. Reprinted from "American Medicine," New Series, Vol. XV., Nos. 9, 10, 11, 1920. 23 pp. A detailed consideration of the relation of income to health. (Apply to Ira S. Wile, M.D., 264 West 73d St., New York City.)

LEGISLATION.

Revised draft of a proposed article of the new constitution for Illinois, to be entitled "City of Chicago," to be submitted to the Constitutional Convention. Report of the Special Council Committee on Constitutional Proposals. 7 pp. 1920. (Apply to James T. Igoe, City Clerk, Chicago, Ill.)

REFUSE COLLECTION AND DISPOSAL.

"A Report and Survey with Recommendations Upon the Municipal Refuse Collection and Disposal of the City of Bridgeton, N. J.," by William F. Morse, Consulting Sanitary Engineer. 15 pp. 1920. (Apply to William F. Morse, Hippodrome Building, Cleveland, Ohio.)

FORESTRY.

A State Forest Policy Adopted by the Oregon State Board of Forestry, December 4, 1920. 27 pp. Includes recommendations for federal policy, state policy, and for federal and state cooperation. (Apply to F. A. Elliott, State Forester, Salem, Oregon.)

CITY PLANNING.

The Decatur Plan, made for the City Plan Commission of Decatur, Ill., by Myran Howard West, of the American Park Builders, Chicago. Published by the Decatur Association of Commerce. 171 pp. Illus-

trated. 1920. (Apply to W. F. Hardy, Chairman of the Commission.)

PIPING.

"The Case Against the Standard Soil Pipe." By A. E. Hansen, Hydranic and Sanitary Engineer. Prepared for and at the request of the Committee on Research of the American Society of Sanitary Engineering. 29 pp. 1921. The pamphlet is in the nature of a symposium citing the opinions of competent authorities against the standard soil pipe. (Apply to A. E. Smith, Secretary, American Society of Sanitary Engineering, State Department of Health, Columbus, Ohio.)

BUILDING.

The Proceedings of the Sixth Annual Meeting of the Building Officials' Conference. 71 pp. 1920. Report of the Conference, and detailed discussion of building materials. (Apply to Sidney J. Williams, Secretary, Madison, Wis.)

TUBERCULOSIS.

Framingham Monograph No. 8, General Series III. Health Letters. Published by the Framingham Community Health and Tuberculosis Demonstration of the national Tuberculosis Association. 84 pp. 1920. (Apply to Donald B. Armstrong, M.D., Executive Officer, Community Health Station, Framingham, Mass.)

HOUSING.

Seventh (and latest) Annual Report of the Home-stead Commission of the Commonwealth of Massachusetts. Published as Public Document No. 103. 23 pp. 1920. Account of the activities of the Commission, whose work has now been taken over by the new Department of Public Welfare. (Apply to Richard K. Conant, Commissioner, Department of Public Welfare, Room 37, State House, Boston, Mass.)

GRADE-CROSSING ELIMINATION.

"The Elimination of Grade Crossings," by Charles H. Huff. A series of six articles reprinted from The St. Louis Star. 30 pp. 1920. Mr. Huff was sent by the Star to various large cities to study grade-crossing elimination, with a view to informing the St. Louis public, as that city was considering plans for getting rid of its grade crossings.

TAXATION.

Annual Report of the [New York] State Tax Commission for 1919. Published by the State of New York as Legislative Document No. 118. 514 pp. 1920. Contains a detailed account of taxation in New York State, with briefer statements of the tax systems prevailing in the other states. (Apply to Walter H. Knapp, President, State Tax Commission, Albany, N. Y.)

CIVIL SERVICE

"Report on a Proposed Classification of Titles and Positions in the Civil Service of the City of Rochester, N. Y." Published by the Rochester Bureau of Municipal Research, Inc., December, 1920. 173 pp. Contains a detailed report of survey of civil service positions in the city, together with recommendations for reclassification and standardization. (Apply to the publishers.)

Municipal Reports

Boston, Mass.—Sixth annual Report of the City Planning Board for the year ending January 31, 1920. (Apply to Elizabeth M. Herlihy, Secretary.)

Bradford, Pa.—First Annual Message to the Council, by Spencer M. DeGoler, Mayor. 1920. (Apply to Hon. Spencer M. DeGoler, Bradford, Pa.)

Chicago, Ill.—Forty-Fourth Annual Report of the Department of Public Works for the year ending December 31, 1919. (Apply to Charles R. Francis, Commissioner of Public Works.)

Chicago, Ill.—Report of the Chicago Zoological Gardens Committee, Forest Preserve District of Cook

County. August 9, 1920. (Apply to Frank J. Wilson, Chairman, 547 County Building, Chicago, Ill.)

Hartford, Conn.—Thirteenth Annual Report of the Department of Engineering to the Court of Common Council. For the year ending March 31, 1920. (Apply to Roscoe N. Clark, City Engineer.)

Jackson, Miss.—Quarterly Financial Statement, July 1, 1920, to September 30, 1920, and annual report of the City Auditor for the fiscal year ending September 30, 1920. (Apply to A. W. Tobias, City Auditor.)

Scarsdale, N. Y.—Report of Special Water Committee. (Apply to Richard R. Hunter, Chairman.)

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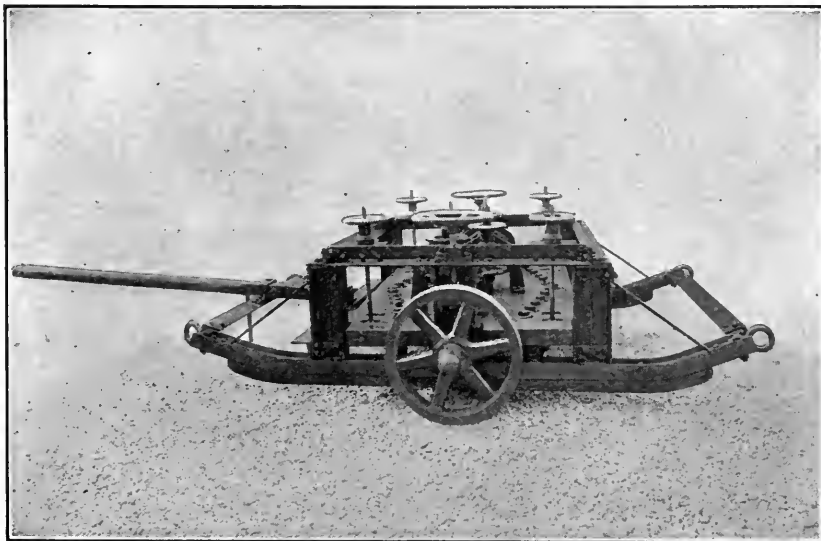
A New Practical Road Planer

A new practical machine for highway maintenance has been invented by Richard A. Jones, for many years Street Commissioner of Waltham, Mass., as a result of his experience and knowledge of the conditions and requirements of modern road construction and maintenance. The Kinney Manufacturing Company, 3529 Washington Street, Boston, Mass., has acquired full rights for the manufacture and sale of this equipment, which is to be known as the Kinney Road Planer, Jones' Patent.

The road planer is especially designed for use on bituminous roads and highways. It is adapted for planing or leveling the waves or ridgy elevations which frequently appear on the road surface. The machine is a combination drag, planer and scarifier. It is constructed entirely of metal and weighs about $3\frac{1}{2}$ tons. It may be drawn by a steam roller or tractor, and the machine is mounted on steel runners. The runners are equipped with removable cast iron shoes, which are of ample length to cover or cross the road waves without following the contour of the surface. Upon the runners is mounted an oscillating iron plate, holding the planer knives and scarifying chisels or picks, all adapted for adjustment by hand-operating screws to meet the varying conditions of the road surface, or according to the kind of bitu-

minous material of which the road is constructed. The entire equipment may be raised or lowered at will or adjusted for planing as required. For moving the machine to a distance or from one job to another, steel wheels are provided, equipped with lifting screws, by means of which the entire machine may be raised and balanced upon the wheels for transportation. When in actual service, the machine is lowered and moved upon the runners. It has a double equipment of picks or planer knives, and may be drawn backwards or forwards without being turned upon the runners.

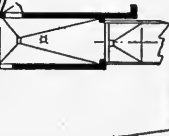
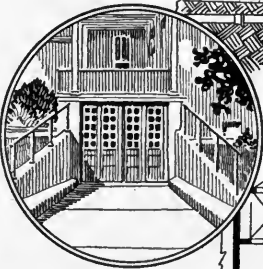
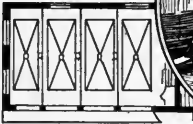
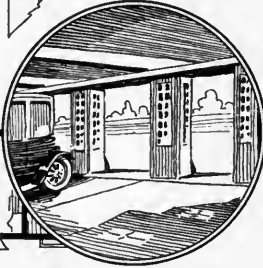
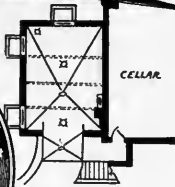
By the use of this machine the bunches or ridgy elevations can be removed from the road surface without destroying the general contour of the road. The facilities for adjustment of the scarifiers and planers in any desired angularity or depth of cut enable the operator to meet the different conditions arising from changing temperatures or varying viscosities of the material used in the construction of the road. In operation the scarified ridges of the road are smoothed and leveled by the planer knives, and after proper sealing and rolling of the leveled portions, the road may be opened to traffic. If conditions require, the entire surface may be treated with a new seal-coat application of bituminous material, with the necessary covering. While designed especially for use on bituminous surfaces, the



A NEW MACHINE THAT PLANES THE ROAD AS IT SCARIFIES

Concrete Garages Built With House

Service Sheet



"Concrete for Permanence"

THERE are a number of reasons for making a garage part of the dwelling: convenience, saving in construction, in lighting and heating, etc.

We recently secured a number of interesting photographs and sketches showing a variety of ways in which a garage has been attached to dwellings, new and old. These suggestions appear on one of our latest Service Sheets bearing the above title.

In addition, we have other Service Sheets or Special Bulletins giving practical hints on the following concrete construction:

Workingmen's Homes
Walkways and Driveways
Concrete Roads
Bridges and Culverts
Foundation and Hatchway
Gutter and Curb
Storage Cellar
Small Warehouses
Spring House
Small Dam
Milk House
Ice House
Manure Pit
Septic Tank
Oil Storage Tank
Tennis Court
Inclosure Walls

Corn Crib
Storage House
Smoke House
Hog House
Poultry House
Dipping Vat
Tanks and Troughs
Piers for Small Boats
Garden Furniture
Greenhouse
Coal Pocket
Posts and Walls
Walls, Sills and Lintels
Garages and Runways
Overcoating of Old Dwellings
Barn and Silo
Cold-weather Concreting

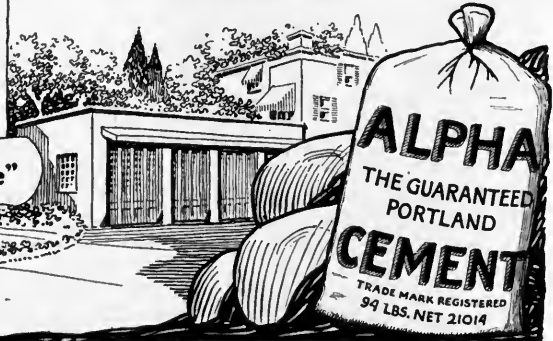
Ask for the Sheet or Bulletin that interests you most, also for a copy of the Alpha 96-page Handbook on concrete construction if you don't already own a copy. This Handbook is not forwarded unless specifically asked for. All sent free of cost or obligation if you live east of the Mississippi. We are obliged to ask inquirers out of our sales territory to send fifty cents to cover the printing and mailing expense. Mention THE AMERICAN CITY.

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Pittsburgh, Baltimore, Savannah, Ironton, Ohio



planer may also be used to good advantage on macadamized or dirt roads.

In the New Hampshire State Highway Department, where this machine has been thoroughly tested under severe conditions, it has been shown that by the use of one machine during the past season a saving of many thousands of dollars has been effected as compared with the expenditures involved in the usual method of reconstruction and renewal. One of these machines will be on exhibition at the Road Convention to be held in Chicago, February 9 to 12, 1921.

A New Development in Snow Removal

A gang of fifty or sixty men for removing snow from the streets of Chicago was replaced by four men and a new snow loader manufac-

trucks, the loader filled the trucks to overflowing very quickly. The machine is mounted on crawlers to gain the best traction. It is powered by a Buda 4-cylinder, truck-type gasoline engine. A 2-armed apron scoops up the snow and turns it onto a wide cleated belt, which carries it up to discharge into waiting motor trucks. This apron plow is adjustable; it is possible to scrape the surface clean or leave enough space to pass over any obstruction. Adjustment is made by the operator from his platform on the loader. Skirt boards 12 inches deep keep the largest lumps on the belt and give it an effective carrying width of 36 inches. The belt is positive drive, being fitted with roller chain on each edge.

Chicago city officials put the loader to work the day after Christmas to remove the snow on Michigan Boulevard. After working the down-



A NEW TYPE OF SNOW-HANDLING MACHINE USED THIS WINTER IN CHICAGO, ILL.

tured by Barber-Greene Company, Aurora, Ill., in its initial test late in December, 1920. Besides successfully replacing so many men, the machine was able to load so quickly that a great reduction was possible in the number of trucks required. Four trucks only, each being loaded in an average of five minutes, were needed where twelve were required before, when most of their time was spent in waiting during loading.

No change had to be made in the usual scheme followed in removing snow by hand. Plows attached to trucks pushed the snow into long windrows in the gutters. In place of swarming gangs of men shoveling into high

town length of the Boulevard, the machine worked across into the loop district. It ran for 30 hours without a pause, being operated by 3 shifts of 8 hours each. A minor repair was made, and the machine continued. One of the things that recommend it most highly to the officials in charge was the fact that it would work just as hard and tirelessly between midnight and morning as at any other time. This is the time when men are least efficient, if they will work at all.

This is one of the first machines of this type to be put on the market, and it is covered fully by patents. Mr. Barber developed the idea late in the summer of 1920. It had its first tryouts



Better Homes—Better Cities

MORE homes and better homes mean greater civic welfare and progress. Well-built, permanent dwellings of fire-resistive type, contrary to popular belief, are decidedly economical.

While a Hollow Tile house may cost slightly more to erect than frame, costs for depreciation, maintenance, and insurance during the years that follow have proved to be about 66% less.

The large size units in Hollow Tile can be laid very easily and rapidly, saving in labor and material costs. The burned clay is enduring; it does not decay; and it successfully resists fire. Depreciation and upkeep charges are vastly reduced.

The air cells, sealed up in the finished Hollow Tile wall, provide exceptionally effective insulation against dampness, heat and cold. They establish uniform conditions that protect health and afford comfort, regardless of the weather.

The value of these advantages of Hollow Tile construction is undeniable, and the use of this material should be encouraged in every way.

City officials and others interested in building regulation work can secure copies, to use as guides, of a "Standard Building Code" drawn up in accordance with best engineering practices. Address Dept. 242.

MASTERTILE

THE TRADE-MARK OF THE HOLLOW BUILDING TILE ASSOCIATION AND YOUR GUARANTEE OF A PRODUCT MADE IN ACCORDANCE WITH ASSOCIATION STANDARDS

THE HOLLOW BUILDING TILE ASSOCIATION
REPRESENTING AMERICA'S LEADING MANUFACTURERS
CONWAY BUILDING, CHICAGO

in coal and ashes. Chicago expects to use the machine for ash and gravel loading during the summer.

Wallace and Tiernan Move

Owing to the steadily increasing growth and rapidly enlarging scope of the business of Wallace and Tiernan Company, Inc., formerly located at 349 Broadway, New York City, this company on January 15 moved to its new plant, Newark, N. J., where under one roof all the activities of its business will be conducted, including engineering, design, manufacture, assembling, testing and shipping, and all laboratory work, as well as the sales and executive supervision.

Wallace and Tiernan are manufacturers of chlorine control apparatus for the sterilization of water, sewage, tannery and other trade wastes, for the purification of swimming pools, for making bleaching solutions from liquid chlorine, largely used in bleaching paper and in the textile industry, and have developed a machine for deodorizing organic fumes in the waste-stacks of refining plants.

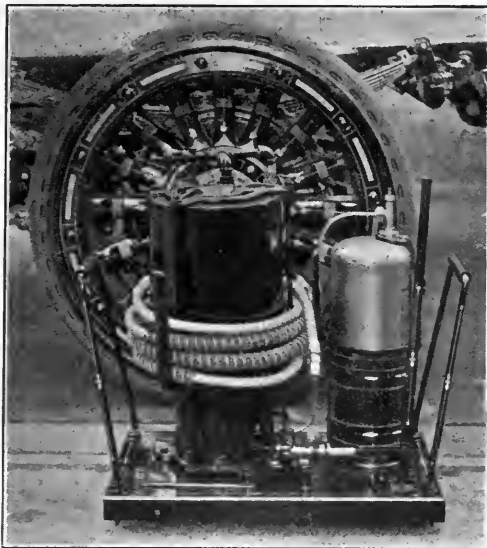
A Portable Device for Thawing Hydrants

After considerable study and experiment, the Ross hydrant thawing device has been developed and is now placed on the market by the American-LaFrance Fire Engine Company, of Elmira, N. Y. This thawing device is simple in construction, compact in design, and effective in operation.

The machine was invented by Louis S. Ross, Newton, Mass., who has long been an expert on steam engineering. The thawing device consists of a steam coil surrounded by a jacket tank, which is filled with water for pumping into the steam coil. By means of a hand-operated pump, water can be forced from the tank into the coils, and by regulating this feed either "wet" or "superheated" steam can be secured at the nozzle. Water is fed continuously into the coil, being converted into steam exactly as is the case when a drop of water falls on a red-hot stove.

The heat is produced from a standard Presto-lite style "B" tank carried with the outfit. Although it is impossible for this boiler to explode in ordinary operation, a safety valve is provided against any unforeseen condition. The steam is led through 15 feet of flexible metallic hose with a braided steel jacket covered for over half its length with asbestos, which in turn is protected by a canvas cover, and the whole wrapping bound with wire. The entire thawing device can be carried easily by two men, for it weighs only 135 pounds completely charged ready for service. It measures only 28 inches across the base, 12 inches wide, and 25 inches high.

The features of portability, the fact that the boiler is not dependent upon an outside source of heat, and the rapidity with which the device produces steam, make this thawing device of general value and unusual practicability



A COMPACT, PORTABLE HYDRANT-THAWING MACHINE

wherever a hydrant thawing device can be used, and of particular benefit to fire departments.

Engineering Firm Reorganizes

The business of Miller, Holbrook, Warren & Co., Milliken Building, Decatur, Ill., has been purchased by the new firm of Holbrook, Warren & Andrews. Under the former name the firm has built up a substantial professional business in the structural and municipal field. The three members of the firm have been active in municipal and governmental work for some time. Frank D. Holbrook was engaged for a period of about 15 years on Ohio River improvements for the United States Government. Willis D. P. Warren has been engaged in various classes of engineering work in Illinois for 17 years and has put in the greater part of his time on municipal projects. Captain Clarence R. Andrew was formerly with the Government on Ohio River improvements and served in France in the Engineer Corps.

Novel Pumping Engine for Fire Service

Practically all motor fire pumping apparatus in service to-day uses the same engine to operate the pump and to drive the machine. The city of Pueblo, Colo., has recently purchased the motor pumper illustrated below, consisting of a standard motor truck on which is mounted a 75-horse-power, four-cylinder Duesenberg motor driving a Lea-Courtenay centrifugal pump. At a recent fire test, water was taken under pressure of 20 pounds and for the first six hours was delivered at 120 pounds pressure to three standard 2½-inch lines, at approximately 750 gallons per minute. The machine as built makes provision for four streams, or ap-

BITOSLAG

REG. U.S. PAT. OFFICE



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Few pavements can withstand the constant abrasion of horses' feet and the damaging pounding of motor truck tires and chains like Bitoslag does. It is a pavement that

Wears Like Iron

and lasts many years. It is simple in construction and is equally durable and effective on country highways or city streets. Extremes of temperature have no effect on Bitoslag roads. Let us know your needs and we will be glad to consult with you at once to your advantage.

Correspondence Invited

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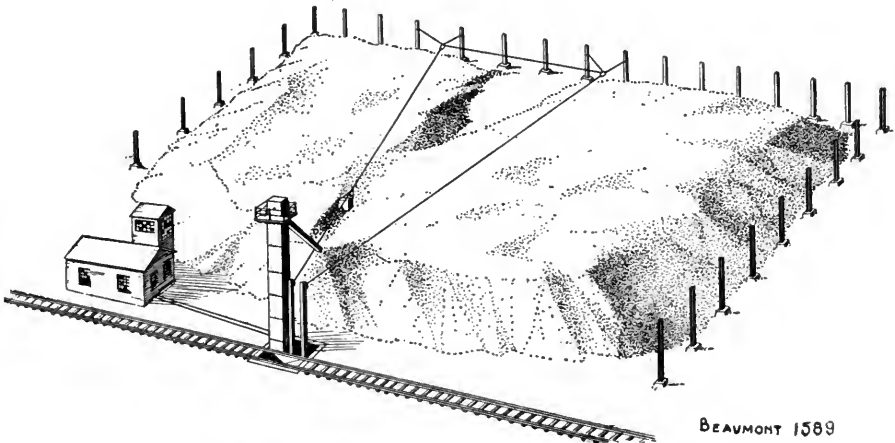


A NEW TYPE OF FIRE PUMPING UNIT WITH SEPARATE ENGINES FOR CHASSIS AND PUMP

proximately 1,000 gallons delivery per minute. The pump, which is a 4-inch, single-stage centrifugal, normally delivers 500 gallons per minute, but readily handles 750 gallons per minute at 100 pounds pressure. This unit was run for 38 hours and 10 minutes, excepting two periods of 40 minutes each caused by moving the unit from one source of water to another, and after this unusual test both the pump and the motor were apparently in as good shape as when first put into service. The Fire Chief stated after the conflagration that Bessemer, a suburb of Pueblo, was saved from destruction by fire through the use of this single unit.

Coal Storage Systems

In the coal storage system involving the use of a cable drag-scraper, manufactured by the R. H. Beaumont Company, Philadelphia, Pa., the coal is received at the plant in railroad cars and discharged into the hopper below the tracks. A chain-and-bucket elevator picks up the coal and delivers it down a chute to form an initial pile 10 feet high adjacent to the railroad track. If the coal is for stoker use, then a crusher is placed in the pit, where it can also be used for crushing frozen slag coal when reclaiming it in winter. A machinery



ISOMETRIC SKETCH OF COAL-HANDLING SCHEME

THE OTTERSON AUTO-EDUCTOR CLEANS CATCH BASINS Saves Time—Money—Labor



Mounted on any 5-TON Chassis of suitable standard make.

THE OTTERSON AUTO-EDUCTOR CO.

SPRINGFIELD, OHIO



Eureka Snow Plow

Horse Drawn Tractor Driven

Will mount curbs with ease and remove 24 inches of snow in one trip. The wings are adjustable to any width and either wing may be detached. One user writes regarding use with tractors, "The plow is so simple and the method of attaching so easy that these facts coupled with the reasonable price should make a strong appeal to all tractor owners interested in snow removal."

THE W. M. TOY COMPANY
Sidney Ohio



No matter WHAT drinking fountain you may put
INDOORS

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The MURDOCK
PATENTED

ANTI - FREEZING
BUBBLE - FONT

IS THE ONLY ONE THAT IS SAFE
TO INSTAL OUTDOORS BECAUSE

it is the only drinking fountain made that was designed and is built solely for outdoor use. It does not have to be turned off at the approach of cold weather.

**THE ONLY FOUNTAIN MADE
THAT IS STRONG ENOUGH
TO WITHSTAND PUBLIC
ABUSE.**

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The MURDOCK MFG. & SUPPLY CO.

**FIRE HYDRANTS
YARD HYDRANTS
HOSE BOXES**

CINCINNATI, - - - - OHIO
Builders of Water Service devices since 1853

house contains the driving drums for the cable extending over the storage yard and having a scraper attached to it. The scraper is dragged back and forth over the coal, and is quickly detachable so that it can be turned around to reclaim the coal. Around the yard are steel posts. To store coal at any portion of the storage yard the tail blocks are changed from one post to another.

When reclaiming, the coal is scraped back to the reclaiming hopper and delivered to the bucket elevator, which will discharge the coal either to railroad cars or to conveyors supplying the boiler house. In the first drag-scraper installation, the machinery house and drums were located above the railroad tracks, but on all later systems the house and drums have been located on the ground, to get longer rope leads to the drum.

supervision of R. J. Sherrill, Commissioner of Public Works, by Kelly & Wilson, contractors, Asheville, N. C. The accompanying illustration gives an idea of the nature of the terrain through which the line runs, and shows a gang preparing to drop a length of pipe into the ditch.

Eibell Leaves Mathieson

F. B. Eibell, formerly Advertising Manager of the Mathieson Alkali Works, 25 West 43d Street, New York City, has resigned to take up the duties of Secretary and to become a member of the Board of Directors of the Technical Advertising Service, Inc., 214 West 34th Street, New York City.

Pitometer Company Moves

On February 1, 1921, the Pitometer Com-



LAYING CAST IRON WATER-MAIN THROUGH ROUGH COUNTRY FOR NEW WATER-SUPPLY OF ASHEVILLE, N. C.

Over Nine Miles of C. I. Pipe for One Job

In the construction of the new pipe line to double the water-supply of Asheville, N. C., 51,300 feet, or 9.71 miles, of 16-inch cast iron pipe were installed. The total length of pipe, weighing 3,264 tons, was furnished by the U. S. Cast Iron Pipe and Foundry Co., Burlington, N. J.

The laying of the 16-inch pipe meant the surmounting of a great many obstacles, in that the pipe was necessarily hauled in wagons through a very rough and mountainous territory to the point nearest to the pipe line. From there the lengths of pipe were "snaked" to the trench to play their part in furnishing the additional 3,500,000 gallons of water daily to Asheville. The work has been done under the personal

pany moved its offices to the Hudson Terminal Building, 50 Church Street, New York City, where it will continue the practice of hydraulic engineering and specializing in water waste surveys for the conservation of municipal water supplies. The district offices at Detroit and Kansas City will remain as formerly.

Blanchard Retained by Colorado Springs

Announcement has just been made that Professor Arthur H. Blanchard, consulting highway and transport engineer, Ann Arbor, Mich., has been retained by the city of Colorado Springs in connection with its \$1,200,000 paving program. Professor Blanchard, has been active in founding the Highway Engineering Scholarships at the University of Michigan.



Winning the Battles of Peace

France has almost won her great fight against war's destruction. Eighty per cent of her wrecked and crippled factories again hum with activity. All of the 4,006 villages and towns in the devastated regions have again resumed municipal life; and of the 6,445 schools in this vast area, 5,345 have been rebuilt and opened. Farms, factories and homes again cover most of the scarred land.

In her reconstruction, France has shown the same unconquerable spirit that stopped her invaders at the Marne.

And here, at home, another great

peaceful victory is being won against the greatest odds. This has been the fight of the Bell telephone employees to rebuild a national service.

Despite all of the difficulties of the post-war period, the organized forces of the Bell system have established new records in maintenance and construction.

Facing, after the armistice, a public demand such as was never before known; they have yet responded to the nation's needs with hundreds of new buildings, thousands of miles of new wires and cables, and with the installation in the last year, alone, of over half a million new telephones.

**AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES**

One Policy

One System

Universal Service

And all directed toward Better Service



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The American City

NEW YORK

MARCH,

1921

The Policing of American Cities

By Raymond B. Fosdick

THE constant recurrence of crimes in all parts of the country, and more especially in the larger cities, has drawn attention sharply to problems of municipal policing. Whether or not there is a "crime wave," the outstanding fact cannot be avoided nor denied—life is cheap and property insecure, and both are far less safe in the United States than in other countries of similar advancement. Comparative tables of the prevalence of crime furnish ample evidence, not so much of a crime wave which might be expected eventually to abate, as of a condition continuing year after year, which up to the present shows few signs of betterment.

It is logical to contrast the figures for the United States with those of Great Britain, both because of the availability of statistics, and because there are ordinarily no wide discrepancies between the figures for England and those for the countries of continental Europe. Consideration of four major crimes—burglary, robbery, auto-stealing, and homicide—furnish rather startling comparisons.

BURGLARY

(Cases including housebreaking by day or night, shop-breaking, sacrilege, etc.)

	1916	1917	1918
England and Wales.....	7,809	9,453	10,331
Scotland	3,977	5,073	*
London	1,581	2,164	2,777
Liverpool	1,135	1,361	1,136
New York City.....	*	9,450	7,412
Chicago	2,113	5,623	3,643
Detroit	2,736	3,080	2,047
Cleveland	*	2,752	2,608
St. Louis	3,212	2,483	2,989

* Not available.

The story is repeated in the burglary insurance rates. Although it is impossible to make exact comparisons, owing to differences of insurance methods and practices, the general conclusion is warranted that burglary rates in American municipalities are from fifteen to twenty times higher than in the principal cities of England.

Robbery, especially highway robbery, appears as an almost distinctively American crime. For instance, in 1918 New York had 849 robberies, as against 63 in London and 100 for all England and Wales. In each of the four years from 1915 to 1918 New York City had from four to five times more robberies than occurred in all England and Wales in any of the five years preceding the war.

Nor is this condition in the United States peculiar to New York. Cities like St. Louis and Detroit, in their statistics of robbery and assault with intent to rob, frequently show annual totals varying from three to five times greater than the number of such crimes reported for the whole of Great Britain.

Thefts of automobiles make a still more discreditable showing. In 1919, 5,527 cars were stolen in New York, while only 290 cases were reported in London. It is impossible to make accurate deductions from these figures, as there are certainly more motor cars in New York than in London. But these figures confirm the others.

Statistics for homicide, including murder and manslaughter, prove how much more cheaply human life is held in this country.

	1914	1915	1916	1917	1918
England and Wales...	220	226	196	180	154
Scotland	39	57	53	29	*
London	46	45	31	39	37
Liverpool	8	8	8	9	5
Glasgow	11	11	18	11	9
New York	244	234	186	236	221
Detroit	*	*	62	94	42
Chicago	216	198	255	253	222
Washington, D. C....	26	25	24	24	27

* Not available.

Before the war the average number of murders per year in Berlin was 25, and in Vienna 19.

No further proof is needed to convince even the most optimistic that American police systems are not successful in combating crime; and, further, that in comparison with European systems they are less effective than those of other countries. The natural reaction in the mind of one reading these discreditable figures is wholesale condemnation of the police. But before indulging in any such sweeping generalization, it is necessary to consider several factors that make the work of the American patrolman and detective much more difficult than that of his European counterpart.

Difficulties of American Police Departments

One of these factors, the importance of which is not easily measured, is the heterogeneity of the population. Not only is there a large foreign element in most of our cities, but there is the enormous negro population in certain sections. The figures indicate clearly that colored persons and those of foreign origin are rather more given to felony than the native white element. For example, the figures for Chicago in 1918 show that the native whites were 62.1 per cent of the population, and furnished 55.1 per cent of the felony arrests. The negroes, with 2 per cent of the population, had 13.2 per cent of the arrests for felony. Figures from other cities show similar conclusions; but they demonstrate that, although the native white population is somewhat less given to crime than either the foreign white or native negro element, the difference is by no means so great as is often assumed. There is in the disposition of Americans a curious mixture of violence and tenderness, which makes them quick to commit crimes of violence, while, at the same time, it causes the public to regard the criminal with a certain tolerance, which may run from an easy-going slackness about following up a prosecution to maudlin sym-

pathy for a thoroughgoing scoundrel. This latter trait accounts for the extraordinary miscarriages of justice in the case of persons undoubtedly guilty of grave offenses.

In addition to the heterogeneity of the population, which undoubtedly increases the difficulties of apprehending a criminal, it is probable that the nomadic character of great numbers of the inhabitants of this country both increases the quantity of crime and complicates the problem of its detection. Our large floating population, drifting from city to city, without strong attachment to any spot, is free from many of the restraints which affect citizens with fixed abodes; and the fact that its members know themselves to be "strangers" in a community gives them a sense of security impossible for a man with a large and varied circle of acquaintances. This, of course, greatly adds to the difficulties of the detective in his search for clues. In older countries, where the population is stabilized, the problem is far simpler. Also, in many countries, especially those of continental Europe, every citizen is required to possess certain identifying papers, such as his birth certificate, record of military service, etc., which considerably facilitates the work of the police in keeping track of suspicious characters.

While admitting that the problems which confront American police systems are exceedingly difficult and complicated, it must also be recognized that the systems themselves are far from perfect. The fundamental weaknesses are the want of continuity in police policy, and "politics."

Weaknesses of American Police Systems

From its beginnings the machinery of police control has been subjected to a shifting series of experiments, in a restless search for ideal systems. With this idea, cities have tried partisan boards, bi-partisan boards and non-partisan boards; they have lodged the appointment of their heads of police in the hands of governors, legislatures, mayors, common councils, boards of public safety, attorney generals, judges of the circuit court, probate judges, state auditors, state commissioners of public buildings, and the people themselves; they have laboriously written into their laws elaborately devised checks and balances, covering every possible contingency of administration, and every item of probable expense; they have borrowed the plans of other cities which

happened at the time to have honest police executives, or have combined the plans of a number of communities in fanciful arrangements of their own, in which, likely as not, an elaborately chosen board of commissioners with full responsibility and no powers was superimposed on a chief of police with wide powers and no responsibility.

In the 75 years in which New York City may legitimately be said to have had a regular police force, nine fundamental changes, involving distinct breaks with the past, have occurred in the framework of her organization. In 91 years, London has made but one real change in the system of control, and the control of the Paris police remains practically unchanged since the days of Napoleon. Obviously, any system, and especially a police system, derives a great part of its virtue from continuity of policy over considerable periods; frequent and kaleidoscopic changes tend inevitably to disorganization and ineffectiveness.

Of the unfortunate influences of "politics" on police organization, little need be said; not because the effects are negligible, but because they are too familiar in every city to require elaboration. It may be deplorable, but it can scarcely be called strange, that the chief or commissioner who realizes that his tenure of office depends not upon his professional ability but upon political fortune, should spend a proportionate amount of his time and energy "where it will do the most good." This political conception—that police positions are plums for the local faithful—has also restricted cities in their choice of officials. In America it would be surprising for a municipality to select its chief of police from another community, regardless of his qualifications. In other countries quite a contrary theory obtains. For example, the police commissioner of London was chosen to that position after twenty successful years in the Liverpool department; the police commissioner of Rome previously headed the de-

partments of Ancona and Naples. The relative merits of this system of selection by demonstrated ability without regard to residence are in marked contrast to the generally accepted American ideas.

With such chaotic policies obtaining in the choice of the higher officers it is evident that the condition of the rank and file must leave much to be desired. Grave abuses have undoubtedly been corrected in many cities by the adoption of civil service regulations of appointment and promotion; but the value of a written examination as a test for promotion is pretty generally discredited, and often enough the examination for appointment is little more than a perfunctory formality. Only too frequently the net result of putting the force on a civil service basis has been simply to make it nearly impossible for a conscientious chief or commissioner to get rid of an undesirable and even rascally patrolman.

The prevalence of crime throughout the country, both in the present and in the past, has demonstrated the fact that our police systems are ineffective, even though we recognize the extraordinary difficulties of the problems of crime prevention they are called upon to face. The American citizen is paying heavily for political corruption, the ineptitude of officials, the lack of continuity and plan in police policy. But the recollection of conditions of the not long distant past leaves little doubt that the turn has come; bad as conditions are now, they are vastly better than those accepted as commonplace and inevitable a generation ago and even more recently. The awakening of civic consciousness in all municipal affairs has come rather slowly, but it has come. In time the American public will have a clearer comprehension of the exacting demands of the police profession, and will insist on systems of police control which will satisfy those demands.

EDITORIAL NOTE.—This article is based upon the author's book, "American Police Problems."

"When people begin to feel the ties which bind them together as citizens, and which attach them to the place which they inhabit, when they understand that their prosperity, their dignity, their happiness are bound up with the welfare of the city; when they learn to cherish their home town, their love for which unites with and intensifies their love for the nation, this expansion of civic consciousness is not the least of the benefactions gained from the adoption of comprehensive programs for future civic development."

The Sanitary Survey a Check on Community Health

By William L. Munson, M. D.

Sanitary Supervisor, New York State Department of Health

WHAT would you think of a business house that never took an inventory or that had no accurate idea whether or not a profit was being made? An answer to this question is not necessary, because "such an animal does not exist." Concerns doing a business that involves the use of other people's money have to know—their employers demand that they know. Old methods in commerce, no matter how good they may be, must give way for better methods. Still, the same expert business men will live their lives in a community and never know whether that community is the best place to bring up their children in, or whether the water is fit to drink. Then when an epidemic of typhoid or some other preventable disease occurs, Mr. Good Business Man will want to know why—and heaven and earth will then be moved in order to check it, when just a small part of the expense and energy, if used before, would have prevented the occurrence. Why, then, you ask, do these things occur when we know how to prevent them?

Community health is now almost reduced to an exact science. The "art of medicine" is rapidly disappearing and in its place is coming exact and scientific medicine. To-day you can buy your protection against disease as you do your coal or your flour. This is literally true with many diseases. If you are afraid of diphtheria because it is prevalent in your community, you can have your blood tested and know whether you will contract the disease if exposed. Then if you are found to be susceptible, you can be treated so that you will not have diphtheria. Surely this is buying health.

The control of many other diseases beside diphtheria is well understood by doctors. Why, then, with all this fund of knowledge at our disposal, are we constantly seeing persons die of diseases that are so easy of control? Simply that we keep the fund of knowledge at our disposal and not in use.

Many people will say, "We have a health department and it is supposed to attend to

these things." Yes, you have a health department, and, in many cases, without appropriations sufficiently large to run a good one-horse peanut-stand. It seems to be very slow work, but gradually people are coming to understand that good health departments and good health officers cost money, just as good roads and good highway departments do. If you want to know where you stand in the protection from disease that your city is giving its citizens, take an inventory of your health department, making a sanitary survey of your city's activities along this line. Put down in black and white on one side of the ledger what you are doing, and on the other side charge up the things that should be done but are not.

The sanitary survey, when completed, should cover all the activities in the city for the promotion of good health. It should also show where the deficiencies are and what should be done to remedy the complaint of shortcomings. Such a survey should contain:

1. Introduction
 - (a) History of work to date
 - (b) Industries
 - (c) Character of citizens
 - (d) Assessed valuation
 - (e) Taxation for all purposes
 - (f) Comparison with taxation for health
2. Statistics
 - (a) Birth rate
 - (b) Death rate
 - (c) Infant mortality rate
 - (d) Longevity rate
 - (e) Morbidity rate
 - (f) Death rate from preventable diseases
3. Record keeping

Covering register for tuberculosis, record cards of communicable diseases, card index for nuisances, card indexes for inspection of milk, meat, foods and buildings, and files for reports, copies of letters, etc., all of modern and accepted character
4. Financial statement

The budgets for two or three years should be given for comparison, showing where and how increase of work has taken place; also, statement of salaries of those employed in the health department should be made

5. Communicable diseases

A list of those reported each year for five years should be given for comparison purposes. The methods of handling these diseases should be known, whether contacts, carriers and missed cases are being investigated, and the methods of disinfection used, also whether epidemiological studies were being made

6. Laboratory work

Number and kinds of examinations made, and whether modern and up-to-date, and if tests for detection of disease are being carried out

7. Nursing service

- (a) Number, whether sufficient
- (b) Kind and character of nursing done
- (c) Routine work
- (d) Constructive work
- (e) Number of visits made, total work done, and results of constructive work

8. Food inspection

Kinds of inspection made, whether special investigators are used, etc.

9. Sanitation

- (a) Water: methods of purification; character and dependability of water; bacteriological counts
- (b) Milk: amount of different grades; number of inspections of dairies; number and reports of bacteriological counts on same
- (c) Sewage disposal: methods used, etc.

10. Clinics

- (a) Child hygiene
- (b) Pre-natal
- (c) Tuberculosis
- (d) Mental hygiene
- (e) Venereal disease
- (f) Pre-school

11. Public health education

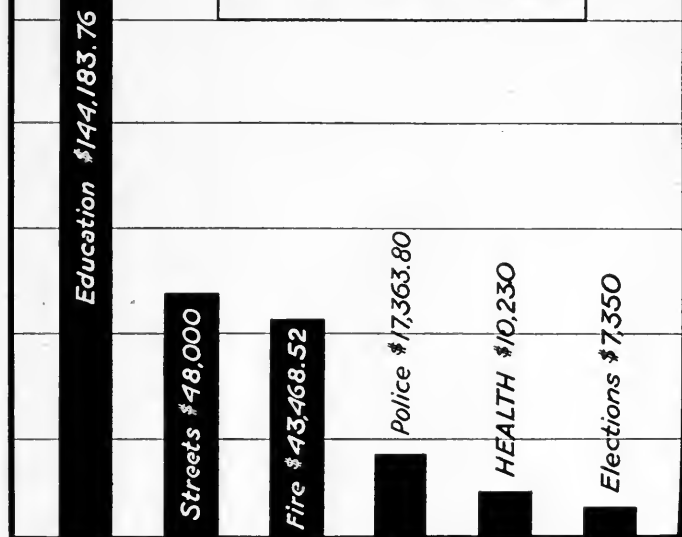
This phase of the work is of great importance and should be stressed. The amount of coöperation of local officials, local newspapers, and local churches should be inquired into

12. Hospitals

Number, kinds, and whether isolation for infectious diseases is provided

CHART OF APPROPRIATIONS
IN A CITY OF 17,000

NOTE LOW HEALTH APPROPRIATION



INCREASED HEALTH APPROPRIATION WILL HELP PROPER HEALTH ADMINISTRATION

13. Recreation

Playgrounds, parks and gymnasiums

14. Industrial hygiene

- (a) Occupational diseases
- (b) General sanitation
- (c) Housing

15. School children

- (a) Amount of defects
- (b) Amount of correction
- (c) Sanitation of buildings
- (d) Disease census
- (e) Education and hygiene

16. Recommendations

Stating the things necessary in order to furnish satisfactory results. These are the items that should be known and well investigated before recommendations are made

A well-rounded health department laying stress upon no particular thing but functioning as a whole, is much to be desired over the health department that may run to one particular phase of public health work, forgetting all others.

When this mass of data is prepared it should not be filed away but should be put

to work. Statistics are good for those who use them; they are good for nothing to those who do not.

What should an analysis of the data in a sanitary survey give in terms that are not technical and can be understood by the taxpayers?

First, the cost of health protection to each person in the city, not to be expressed in so many mills per dollar of assessed valuation but the amount in dollars and cents to each thousand dollars of assessed valuation; thus, "the tax rate for health service is 89 cents per \$1,000 of assessed valuation, or, a taxpayer having a home assessed \$4,000 would pay \$3.56 per year to protect that home from disease." This, it is apparent, can readily be understood. Also, the cost per person should be given.

Second, a proper survey will show "old stock on hand." If antiquated methods are used they will be unearthed and should be discarded. Duplication of work, and unnecessary work, will be shown.

Third, the offenses of omission are brought to the surface in making such a complete inventory, and these corrections should be in the recommendations.

Fourth, graphic chart showing amounts of different appropriations for various city activities, communicable diseases, movement of infant mortality, birth and death rate.

It is not advisable to clutter up an otherwise good survey with material that requires an expert to interpret it. Nothing, however, is as convincing to the lay mind as a picture of the relative difference in appropriations for various activities.

The Reward of City Planning

By L. S. Cole

City planning may be divided into two major phases, namely, city building or rebuilding, and city extension. In this latter phase the realtor looms large, and on him rests a large part of the responsibility for the success or failure of the work. He should give careful attention to the future needs of the city in general and of the district in particular, considering the welfare of his city before his personal gain, making himself a power for good in his community. In this way only will he merit the distinction which the title of "realtor" confers upon him.

Many cities are blessed by nature with hills, valleys, streams, etc. These are things of beauty as well as utility. How often we find a city which considers them liabilities! Here is a town bisected by a creek too small for navigation. It is made into a dumping-ground and general health menace, the cause

of endless litigation and expense, an eyesore, which if properly handled would prove a source of pride and pleasure, a priceless asset.

These are the things city planning aims to correct through careful zoning of industrial activity and control of building expansion, together with utilization of natural and created resources. Thus shall we be able to attract and retain industry, foster commercial activity, inculcate and build up in increasing measure the spirit of community service, to our personal gain and national prosperity. Increased benefits, reduced taxes, these shall be our reward; for, after all, taxes are merely the selling price of community service, and the burden or privilege of paying taxes will be determined entirely by the measure and quality of the service rendered.

ACKNOWLEDGMENT:—From an address delivered before the Indiana Real Estate Association.

An Annual Transportation Prize to Be Awarded

The American Society of Civil Engineers at its annual meeting in January accepted the offer of the *Engineering News-Record*, to establish an "Arthur M. Wellington Prize" to be awarded annually for the best paper presented before the society on any phase of the science and art of transportation, whether by land, water or air. The

prize is a memorial in honor of the former editor of the *Engineering News* and author of the well-known book entitled "The Economic Theory of Railway Location." A fund of \$2,000 has been provided, the annual income from which will constitute the material element of the prize, and should stimulate thought on this subject.

Linking New York and New Jersey

The Isolation of these Two States from Each Other to be Overcome
by New Vehicle Tunnels

By Clifford M. Holland

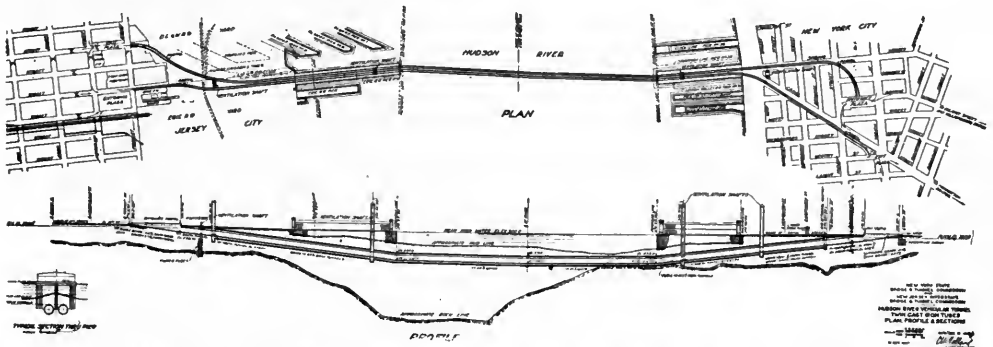
Chief Engineer, New York and New Jersey Tunnel Commission

THE states of New York and New Jersey, which are vitally interdependent, have needed for many years a larger and more reliable link in their transportation facilities than the present overburdened ferry system. There is no room for the expansion of the existing ferry service, and the transportation business of the waterfront has vastly outgrown its present facilities. To overcome this lack of transportation the new interstate tunnel was proposed and is now actually under construction.

Although the total cost of the undertaking is estimated at \$28,669,000, it has been shown that with reasonable tolls the tunnel will not only pay its maintenance but within

noxious exhaust gases from motor vehicles. The ventilation problem has been one of the most difficult of solution in connection with the tunnel project.

The tunnel will run from Canal Street, New York, a wide east-and-west thoroughfare which is approximately at the center of down-town traffic over the Hudson ferries, to a point almost directly opposite on the New Jersey shore, thus giving a tunnel of minimum length. The New Jersey terminus is near the center of traffic and affords direct communication with Jersey City Heights and points beyond, and the waterfront and railroad yards are easily accessible.



PROFILE AND PLAN OF THE NEW YORK-NEW JERSEY TUNNEL, WORK ON WHICH IS ALREADY UNDER WAY

12 years will pay its entire cost of construction, and by the end of 20 years there will be a surplus of more than \$66,000,000 to be divided between the states of New York and New Jersey.

The essential features of the proposition are the construction of twin tubes of cast iron, 29 feet in external diameter, larger than any existing American sub-aqueous tunnel of the shield-driven type. The mean length of the cast iron ring section will be 6,600 feet, and the distance between grade points of the tunnel—which includes the open-cut approaches—is 9,300 feet. There are to be two ventilating shafts on each shore to take care of the removal of ob-

In determining the traffic capacity of the tunnel, the chief considerations were: (1) volume and character of the vehicular traffic which will seek the tunnel; (2) capacity of one, two and three lines of traffic in each direction; (3) economical size of tunnel in relation to amount of traffic; (4) limitation of traffic by street congestion in vicinity of tunnel entrances and exits. A careful study of the average daily traffic based on 24-hour counts made at the ferries was 12.2 times the maximum hourly traffic. A study of conditions showed that a two-line tunnel—that is, four traffic streams—will have sufficient capacity to accommodate all traffic of motor as well as horse-drawn vehicles

up to the year 1935, and if horses were eliminated during rush hours its capacity would not be reached until 1937.

To determine the proper dimensions of the tunnel, measurements were taken of vehicles crossing the Hudson River on the ferries between New York and New Jersey, and it was found that their height varied from 6 feet 6 inches for passenger cars to a maximum of 13 feet for large loaded trucks, but that the number exceeding 12 feet in height was not over 1 per cent. It was also found that the width of motor vehicles varied from 6 feet for passenger cars and light trucks to a maximum of 10 feet 6 inches for army transport trucks. In the case of three-horse teams, the outside dimension of three horses abreast was found to be 9 feet, but the number of vehicles exceeding 8 feet in width is only $3\frac{1}{2}$ per cent.

Motor truck manufacturers suggested 12 feet 2 inches as the greatest distance between the road and the top of the truck body, and 8 feet as the greatest width of the body. To provide for all contingencies, such as unevenness in the surface of the roadway, spring action of vehicles, and allowances for jacking up in case of breakdown, the clear headroom of the tunnel was fixed at 13 feet 6 inches.

With the tunnel carrying two lines of vehicles in the same direction on one roadway, the normal operation conditions are as though there were one vehicle 8 feet wide in the slow line, and one 6 feet wide in the fast line. There may be times, however, when there will be 8-foot-wide vehicles operating in both the slow line and the fast. In the slow line of the two-line tunnel vehicles operating at a speed of 3 to 6 miles per hour should have a clearance of not

less than 6 inches between the outside of the tire and the curb, while in the fast line, on account of the greater speed, this clearance should be not less than 1 foot. Allowance is made for a minimum clearance of 1 foot 9 inches between the moving vehicles, and the minimum width of roadway is 19 feet. For safe and convenient operation, however, a clearance of 2 feet 9 inches between the moving vehicles should be provided, giving a 20-foot width of roadway for two-line traffic, which has been provided.

The problem of ventilating the tunnel has been investigated under three main subdivisions: (1) amount and composition of exhaust gases from motor vehicles; (2) dilution necessary to render these exhaust gases harmless; (3) method and equipment necessary for adequate ventilation. After very thorough study the tunnel has been designed with four ventilating shafts, two of which, 3,400 feet apart, are located near the pierhead line, and the other two between these shafts and the portals. With this arrangement, cost of operation is reduced to about one-quarter of what it would be if the tunnel were provided with only two ventilating shafts at the bulkheads. All fans and motors are to be located in structures at the top of the ventilating shafts, and will be of standard sizes. The fresh-air duct is to be located between the roadways and the exhaust duct above, in accordance with the results of experiments conducted in 1916 by the Public Service Corporation of New Jersey.

Work has already begun in digging the shaft for the tunnel, and contracts are being let gradually, in order to take advantage of the possible reduction in labor and material costs within the next three years.

Data Sought by the Hospital, Library and Service Bureau

The Hospital, Library and Service Bureau, 22 East Ontario Street, Chicago, Ill., has been organized by national hospital, public health, nursing, social service and other organizations, aided by the Rockefeller Foundation. It will serve gratuitously those persons interested in the construction, equipment and operation of hospitals, sanatoriums, dispensaries, health centers, and institutions of like nature.

Those interested in the material which is being collected by this bureau may secure a tentative outline on request to the above address. Attention is particularly called to the fact that very little information has been collected as yet, and the cooperation of all agencies is sought in adding to the material on file in order that greater use may be made of it by all health agencies.

Present Methods of Concrete Road Construction

General Data for Public Officials

STRICTLY speaking, there have been few actually new developments in the construction of concrete roads during the past season. Certain new adaptations or uses of equipment have been found which have been in existence before. The year was largely occupied by contractors and engineers in trying out and studying the results of various types of equipment.

Letting Contracts

Perhaps the most interesting and most striking new development has been the change in ideas regarding the letting of contracts for road construction. There has been a general tendency toward awarding

a longer time, before good construction weather begins, to fill their orders for road machinery. While not all of the aggregates for road building can be shipped and stored at the site of the improvement during the winter months, because of the difficulties in washing and in shipping freshly washed material, the aggregate producers have ample opportunity for making improvements and additions to their plants so as to take care of orders as soon as the season for shipping opens. In a great many cases these producers can operate throughout the cold weather and store their material ready for shipment at the proper season. Finally, the delivery situation is very much simplified



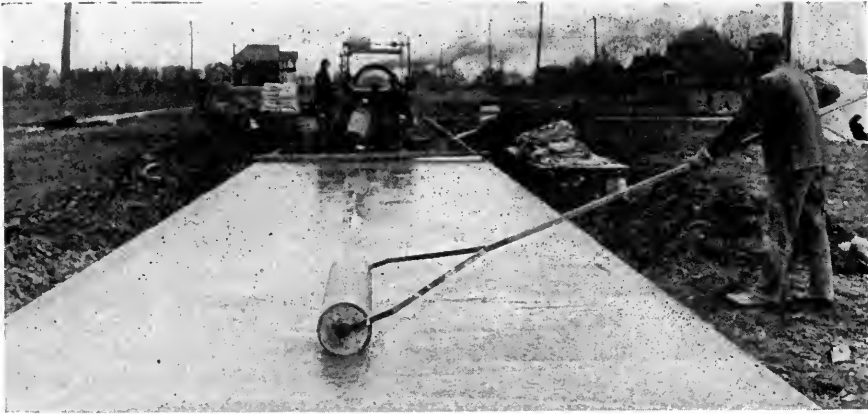
THE MECHANICAL TAMPPER AND FINISHER

more contracts during the winter months. This winter may not see so many contracts awarded as is perhaps desirable, but a definite beginning in this manner of contract letting is being made. During the entire month of January, 1919, there were awarded 268,782 square yards of concrete pavement, while reports for the month of January, 1920, show the award of 1,973,193 square yards.

There are many advantages in this idea of contract letting. Contractors are able to plan their equipment for the work which they have on hand during a season when work outside is impossible. In turn, the manufacturers of this equipment are enabled to gauge their markets, and they have

because open-top cars, in which aggregates are most frequently shipped, are available during the early months of the year for this type of work.

There has been some thought given by officials and contractors in different parts of the country to the form which a contract should take. While a great many contractors favor the cost plus a fixed percentage contract, others of excellent repute do not like this form of contract at all. As one large contractor has said, "Immediately it becomes known on the job that the contract is cost plus, even the mules on the job learn to loaf." There is a definite tendency toward the development of a contract in which the bidder itemizes the unit prices of



THE HAND ROLLER FOR SECURING A DENSE SURFACE

each item entering into the finished work, with the exception of labor. In this manner, should the cost of any material fluctuate up or down, the contractor is protected and the public profits by the reduction, or bears the expense, as the case may be. In the ordinary form of contract the bidder must consider the possibility of a change in prices, and, in a period of rising markets, to protect himself against an increase in the cost of the work he must bid accordingly higher. In other words, the contractor must often assume a risk and charge accordingly.

Purchasing Materials

One question which has received a considerable amount of discussion is the matter of the purchase of the material in the state highway contracts. A number of states now purchase one or more of the ingredients entering into the construction of roads and supply it to the contractor. The usual idea of the contractors in regard to this practice is that the contractor should be allowed to buy all of his materials in the open market. The contractor is frequently in a position where instant action is necessary to get a delivery of material. Delay costs him a great deal of money. The contractor in many cases can by paying a certain premium for the purchase or on the delivery of material save a far more costly delay which would be caused by having his equipment idle.

Inspection at Source

The quality and the grading of aggregate are designated in the specifications under which the contractor works. It is often the case, however, that a shipment of ma-

terial when it arrives at the job does not come up to the specifications in one respect or another. In this case the inspector on the work condemns the material, and it must be taken away. There is a definite tendency toward the placing of an inspector at the plant which is the source of material, to see that the grading is correctly done and the material up to the specifications in every manner before it leaves the plant. This method of inspection is resulting in economy for both the contractor and the state, county or other agency letting the contract.

Size of Aggregate

The fact that a number of states and counties are increasing the larger limit in the size of coarse aggregate is particularly interesting. Actual consideration has shown that the pavement built with aggregate containing the larger sizes is as good as, and sometimes superior to, that built of the ordinary standard size. The aggregate producers favor this change in specifications because it will materially reduce the cost of the finished product. There is less wastage of stone at the plant and at the quarry when the larger sizes can be used.

Use of Bulk Cement

During the past season the firms having large road contracts have been handling their cement in bulk form almost entirely. This manner of shipping cement has proved necessary in the operation of a large construction plant. The cement is more easily handled with the same equipment that is used for the coarse and fine aggregates, namely, the clam-shell bucket; and the en-

tire central proportioning or central mixing plant is better organized without having to follow the laborious method of handling cement in sacks. One very important item is the large amount of capital which is tied up in the use of cement sacks. Sacks are costing more and more to manufacture, and there is always a large percentage of lost sacks.

Use of Finishing Machines

While the finishing machine for concrete pavements has not been a definitely new development of 1919 or 1920, its use and operation have been outstanding features of the construction season. In the state specifications covering 1919 work, only five permitted the use of the finishing machine; in those of 1920 twenty states permitted machine finishing. In Illinois the work of the machine has proved entirely successful and the specifications are to remain in effect. Wisconsin has not mentioned the use of the finishing machine in her state specifications, and at a conference between contractors, material dealers, equipment manufacturers and state highway engineers definite statements were made to the effect that until the results from using the machine were proved entirely successful in other places, this method of finishing would not be specified. On no known contract has the capacity of this machine been approached. The apparatus is idle a considerable portion of the time of

each working day.

The roller-and-belt method of finishing has been followed in practically every state in the country on both large and small jobs. The performance of this apparatus is already known to be perfectly satisfactory.

Balance of Plant Necessary

No matter what type of equipment or plant layout the contractor uses, from the smallest road contract to the largest, there is need for perfect balance of every part of the plant. A mixer of large capacity cannot justify its existence on a piece of work unless the materials reach it so as to keep it busy constantly, and unless the finishing behind the mixer can keep up with its performance. In addition to a balanced equipment, there must be constant attention paid to keeping each item in perfect repair. A breakdown of any part causes an unbalancing and breakdown in the entire system. A repair crew under the direction of a master mechanic, and a complete stock of repair parts, are of vital necessity on every job.

There is work for this repair crew, or at least a portion of it, throughout the entire winter season. Every part of the equipment needs overhauling and to be put in perfect shape for consistent work for the coming season. There are improvements that the contractor will find necessary, and parts of equipment which he can build, or at least remodel, in his own shop. Every



FINISHING THE SURFACE BY HAND BY THE BELT METHOD



PROTECTING THE NEWLY FINISHED ROAD WITH CANVAS ON LOW FRAMES

part of the entire plant should be in perfect order and ready to start the season without the usual details which so often occur.

Central Mixing Plants

During the past two seasons in the larger contracts the method of preparing the correctly proportioned batch at a central plant was followed. In some cases this batch was hauled to the mixer on the road and there mixed and placed on the subgrade. In other instances the batch was mixed at the central plant and hauled wet to the subgrade and there dumped. No definite lines can be drawn to show the size of the contract on which the industrial railway hauling a dry or wet batch is more economical than hauling by truck. No outstanding features in favor of or against the hauling of a mixed batch of concrete over a distance of several hundred feet to more than a mile have proved that it is better or worse than any other method. Each of the methods has proved satisfactory, but it will take more study and more experience to develop any definite knowledge regarding consistent performance of one method or the other.

Preparing the Subgrade

There are certain construction methods which are known to be proper and which need emphasis. Too much cannot be said in regard to the preparation of the subgrade. Not many actually new methods in subgrade building have been discovered for a number of years. On the other hand, the recognized good methods of building the subgrade have too frequently been left in discard, and the foundation for a costly

pavement has been inadequately made. Engineers too frequently forget or disregard the problem of draining the subgrade. The different soils over which the pavement is laid have not been analyzed in a great many cases, and engineers have not always met the problems involved in each type of soil.

Little need be said about the side forms for concrete pavement, further than the necessity for perfect support on the subgrade. The heavy subgrade finisher and concrete tamper and finishers which are coming into wide use must be supported on forms which remain perfectly true to the grade under their weight. The evenness of the longitudinal grade of the finished concrete depends upon the strength of the side forms, the accuracy by which they are laid, and upon their retaining a perfect grade under the weight of the finishing machine.

Testing Concrete and Curing

A great deal has been said about the proper consistency of mix used in concrete pavements. The slump test was developed, by which the amount of water in the mixture was gaged according to the amount of slump in a column of concrete left after the withdrawal of a cylinder. Practical use of this equipment, however, suggested the use of a truncated cone instead of a cylinder, because the concrete was less liable to be disturbed by the removal of the form.

No new methods have been developed in the curing of the finished pavement, but special emphasis should be given to the proper methods, which are well known. During warm weather it is essential that a

canvas cover be suspended over the pavement immediately after finishing it, to prevent too rapid evaporation of the water in the concrete. Then may follow the curing cover, either a layer of water or of wet earth, which remains on the pavement for two weeks or longer.

Concrete Roads Must Be Maintained

Maintenance of pavement is too often done in a dilatory manner or is completely forgotten. Concrete roads need regular maintenance, as does every other type of pavement. This maintenance consists chiefly in filling the joints and cracks with

regards the supply, training and salaries of the engineers, the improvement of the practice in awarding contracts, and the development of material supplies.

During the coming years the road-building program is going to demand an increasing supply of engineers. These men will need training. It will cost them a great deal of time and expense in securing this training. After they have secured it, the positions into which they step should carry with them salaries which are at least commensurate with the ability acquired and the responsibility involved by the position.

It is evident that material deposits will



CURING A CONCRETE ROAD BY PONDING

bituminous material, which prevents the passage of moisture to the subgrade. This operation should be performed regularly as early in the spring as the work can be done to advantage, and late in the fall. It should be done regularly at these intervals and at such other intervals as are found necessary.

It is doubtful if there are any bad practices in the present methods of building concrete roads which should be eliminated. Rather there are certain practices which need improvement. In general, these are as

often be found from which the aggregates for road construction can be supplied, if surveys are made in the regions where projects are to be built. If these deposits are developed, the cost of the aggregate on the job should be lower than when shipped long distances. This applies, however, only in cases where established plants cannot economically compete with local deposits, because of shipping facilities or because of the character of the material which they handle.

The Need of Hospital Service for Rural Communities

Attention must be given to the relation of the rural hospital in a general community health program to other programs of local government and welfare service. The hospital represents merely one factor in public health work and private medicine. Public health work again is but one factor in the general program of public administration. One must needs keep in mind that

funds must be provided by a community for the financing of all its various public services; for the general government purposes of the legislative, executive and judicial departments; and for the special services of protection of persons and property, of education, of recreations, of charities and corrections, of highways, and last, of health, sanitation and hospitals.

Street Lighting in City and Town

By Reginald Trautschold

EVEN less than a decade ago, street illumination was almost wholly for utilitarian purposes—to discern large objects and surface irregularities in the street and on the sidewalk, and comparatively little was accomplished in the way of ornamental street lighting, as modern street illumination has quite generally become termed. The commercial and artistic aspects of the question could almost be said to predominate, for the actual money value to a town or city of well-lighted streets has been shown repeatedly by the great increases in commercial and real estate values of brightly illuminated business sections and of harmoniously and properly lighted residential districts. Civic pride is concerned, for a city is often judged by its first impression on strangers, and there is the gain in safety to pedestrians, traffic and property which proper illumination invariably engenders.

The question of safety alone would suffice to warrant the importance now placed on adequate and plentiful street illumination. To conserve coal during the war, most communities drastically reduced street illumination, with rather unfortunate results so far as lawlessness was concerned and the number of accidents attributable to lack of sufficient light. In Cleveland, accidents directly chargeable to lack of daylight—i. e., those customarily occurring after dark—increased some 37½ per cent when the lighting was cut down. In the metropolitan district of New York the number of people killed at night increased 73 per cent, and the number of injured 21 per cent, from 1913 to 1915.

Adequate and proper lighting is highly important to all communities, large or small, and it has been made possible in large measure by the development of electric lighting. Good street illumination may not be wholly

attributable to the use of electricity, for there have been some installations of gas street lighting which have been and still are reasonably modern, chiefly in the smaller towns in residential communities, but it is certain that electric lighting predominates and is, as a rule, the convenient and economical system to employ.

Systems of Electric Street Lighting

Two systems of electric street lighting are in quite general use—the arc light and the incandescent—and it would not be fair to say that the modern incandescent street lamp has or will immediately supplant the older arc light, despite the numerous advantages which the former possesses. Both systems have their fields. The arc lamp, which has been improved greatly since its commercial introduction about 1880, maintains a certain place for itself where powerful sources of light are required, by virtue of its efficiency in lumens per watt consumption, and sometimes the more yellowish light of some arcs is considered an advantage. The most efficient and useful arc lamp for street lighting is the direct-current, series, luminous or magnetite arc lamp, either in the pendant or upright (ornamental) type. It is economical to maintain and reliable in operation, consuming about 500 watts and giving a total illumination of about 1.8 times that of a 100-candle-power, modern, street series incandescent lamp.

The average cost of operating such an arc lamp is approximately the same as that for a 1,000-candle-power street series incandescent lamp. Diffusing and distributing glassware is used to moderate the glare of arc lamps, as it is with high-power incandescent lamps, but even with such aid the use of arcs is now pretty well limited to centers of street intersections and to the middle of broad avenues.





SMALL TOWN BUSINESS STREET WITH ORNAMENTAL POSTS AND SINGLE FIXTURES

Now that incandescent street lamps may be obtained in sizes up to 1,000-candle-power, they are used very extensively for general service, where high degrees of illumination are required, as well as where more moderate lighting suffices. They provide moderate power with very good efficiency, and the tendency in public street lighting now is to use the smaller and more flexible types of illuminants, which tend toward simplification of the lighting system and are procurable in a number of sizes. Technical considerations which are of considerable economic moment also favor the use of the modern street series incandescent lamps. The comparatively low voltage at which the series incandescent lamps operate is an advantage. This prevents the excessive heating of the lamp and also allows the use of heavier filaments than in constant voltage incandescent lamps such as are used in industrial and domestic lighting. Though the filaments of series incandescent lamps gradually evaporate in use, this also increases their resistance, so, with the current maintained virtually constant, the current density in the filament is consequently increased, and very nearly uniform intensity of light is maintained during the life of the lamp. This life will average close to 1,350 hours. Carbons of arc lamps, on the other hand, have to be renewed after about 120 hours' operation.

Lighting Circuits

The modern incandescent lamps for street lighting operate on alternating current circuits—the only exceptions being a few isolated plants and some small public-service

installations where the conditions of growth have not warranted new and more efficient equipment—with the lamps connected in series, rather than in multiple. The fundamental advantage of series lighting is the economy in the use of copper, but an advantage of even greater importance is the uniformity in the operation of the lights secured by the series connection. In series circuits the same current is forced through all the lamps in the line, while in the case of multiple circuit, which is used for all domestic and industrial lighting, it is the voltage which is supposed to remain constant. This, however, is not entirely possible on a multiple circuit, on account of the voltage drop in the line between successive units, though the loss can be greatly reduced—almost to a negligible quantity—by the use of extra quantities of the expensive copper, so where the distance of transmission is great, as in street lighting, it is much more economical to use the series system.

Alternating current circuits for street lighting are pretty generally standardized at 6.6 amperes—occasionally at 7.5 amperes—and though such current is suitable for the smaller lamps and is used for lamps up to 400 candle-power, greater efficiency is secured with 600- and 1,000-candle-power lamps if the current strength is increased to 20 amperes, the voltage at the lamps being reduced correspondingly. Even in the case of 400-candle-power lamps, a current strength of 15 amperes will increase the efficiency of the lamp. To secure this increase in current strength, compensators are installed next to the lamps of greater power. These compensators, which are

really step-down transformers, also serve another important function. They act as "choke coils" or checks against surges or sudden changes of current strength produced accidentally, through short-circuiting a number of lamps or through the action of other current-consuming elements in other parts of the same circuit. In the case of filament failure, the compensator acts as a cut-out and permits the current to flow in series through the other lamps in the circuits.

For series street lamps of low candle-power which are not provided with compensators, a film cut-out held between the conducting clamps is provided to guard against breaking the circuit should the filament of a lamp fail. The thickness of this film is such that it is an insulator at the normal voltage of the lighting circuit, but when a lamp filament fails, the voltage piles up and punctures the film, establishing a short circuit, or by-pass, which allows the current to pass on through the lighting circuit as before, without passing through the damaged lamp.

Selection of Lamps

When electric street lighting was first taken up with a view to beautifying the street, as well as for the more practical purposes of proper street illumination, the

this reduces the expense of maintenance. The poles, compared to those of cluster standards, are slender and graceful and therefore less conspicuous. They lend themselves to more artistic treatment and harmonize better with the architectural surroundings, but the chief advantages of the single-light arrangement are very practical.

The efficiency of the single light is very much higher, for the light from several lamps in a cluster is reduced by interference between the various globes and the pole itself. Each globe not only absorbs light from the lamp within, but also obstructs light from all the other lamps. The loss in many cases amounts to 15 or 20 per cent. In fact, it is claimed that a 20 per cent increase in light with a saving of 10 per cent in wattage can be secured by the use of single large lamps.

In the question of light distribution, the single light also shows up to decided advantage, for though the downward illumination is very nearly the same for both arrangements, the upward illumination is nearly 50 per cent greater with the single light. Initial cost and maintenance expenses are naturally much lower with the simpler standard, and the single light is much more flexible, as refractors, globes and reflectors can be provided to throw the light in any desired direction, an arrangement not feasible, as a rule, when there are a number of individual lights.

Street Lighting Systems

As illumination requirements are rarely comparable in even quite similar localities in cities and towns, it is quite impossible to advance rules or even definite recommendations incorporating the advisable candle-power

CHARACTERISTICS OF MAZDA SERIES LAMPS

Nominal Rated Candle-Power	Total Lumens	Watts Consumed	
		6.6 Amperes	7.5 Amperes
40	400	35	36
60	600	46.8	48
80	800	60	60
100	1,000	72	72
250	2,500	155	147
400	4,000	244	228
		Lamp Amperes	Watts at Compensator
400	4,000	15	210-245
600	6,000	20	297-330
1,000	10,000	20	475-544

tendency was to use ornamental fixtures with clusters of comparatively low-candle-power lamps, each in a diffusing globe mounted on decorative standards some 10 or 12 feet high. This practice has been greatly modified since the high-power incandescent lamps for street lighting have been available, and now the standard with a single powerful light promises to supplant the more elaborate equipment. The single-light standard can be more widely spaced, and

of lamp, type of reflecting, refracting and diffusing equipment, spacing of posts and height of lamps, that are not susceptible to such modification as to be of really little value. However, as in most cities, towns and even villages there is the important business district, the less important business streets adjoining, possibly a factory district, important and less important residential streets and quite probably parks, some indicative guide for the district

can be made. This classification of streets or districts can, of course, be greatly expanded, but it will serve to indicate that there are roughly six classes of streets the lighting requirements for which will vary in every city or town of fair size, the intensity of the desirable illumination decreasing with the importance of the street for business purposes in the order mentioned.

The spacing of the lighting standards will vary between quite wide limits—say between 50 and 100 feet, or even more; the wider the street, the closer should be the standards. This introduces the question of whether the lighting standards should be placed along the center of the street, as is done on some wide boulevards and avenues, or, if placed along the edges of the roadway, whether the lights should be placed opposite one another or the staggered arrangement adopted. As far as lights skirting the roadway are concerned, a general scheme which tends to a harmonious and decorative layout is to place the lights opposite one another when standards are set at each of the four corners of intersecting streets and to stagger them when lights are located at two diagonal corners. The mounting height of the lights should be adequate to keep all powerful rays of light out of the plane of vision, even when—as should invariably be the case where high illumination is employed on important thoroughfares—diffusing media are employed.

The illuminating systems of important

cities naturally serving as criteria for the lighting of other communities, it may prove of interest to record the present standard of New York in this respect. As an indication of the cost of illumination, the power of the lamps used will be given in watts, a 500-watt lamp of the street series incandescent type giving approximately 1,000 candle-power. On the brightest streets, 500-watt lamps are used, mounted 20 feet above the road. On car streets and wide avenues the standard lamps are 400 watts, mounted at the same height. On the avenues where the traffic is not so heavy, 300-watt lamps are used, the 20-foot height being general. Residence streets are lighted by 200-watt lamps placed about 16½ feet above the sidewalk, or by 100-watt lamps at a height of 14½ feet. The lighting of the parks in New York has been pretty well standardized. The lights are staggered on either side of the roadway, 80 feet apart, mounted at a height of 10 feet, and are of the 100-watt size. In Cincinnati, another well-lighted city, the general scheme is to place the lighting standards opposite one another at 80-foot spacing, with the lamp filaments 13 feet 4 inches above the road-bed.

Typical of good lighting practice as are these arrangements, they fail to convey a proper application of the degree of illumination attained. In New York, the illumination on a plane 4 feet 8 inches above grade, the average intensity in well-lighted streets is 0.135 candle-power, with a maximum of



LIGHTING SCHEME FOR A HEAVILY SHADED STREET WITH SERIES INCANDESCENT LAMPS ALONG THE CENTER OF THE ROAD

0.96 and a minimum of 0.021 candle-power. On other brightly lighted business streets the intensity of illumination varies from 0.015 to 1.04 candle-power, with an average of 0.185, while on still others the range is between 0.010 to 0.75 candle-power, with an average of 0.135. Well-lighted residence streets have an average illumination of 0.068 candle-power, the maximum and minimum being 0.347 and 0.0102 candle-power respectively.

Lighting Residential Districts

In the lighting of many residential districts, the presence of shade trees and the desire to secure as uniform illumination of them as possible often makes it necessary or advisable to use only small-size lamps. Decorative considerations make it customary to place the lights in opal balls mounted on ornamental posts, with the result that a large amount of the light is thrown upward and so lost for lighting the street. To avoid this drawback, approved practice is to employ prismatic reflectors to collect the upward rays of the small lights—usually 100-candle-power lamps—and redirect the light outward at a slight downward angle. These prismatic reflectors consist usually of a double concentric band with smooth outer and inner exposed surfaces, with prisms on the two inside surfaces, sealed at top and bottom to exclude dust and dirt.

Lighting Country Roads

For rural highways the lighting fixtures are usually of the comparatively inexpensive variety with the lights and reflectors mounted on long mast arms over the center of the street. As it is impossible to secure any degree of uniformity in light intensity, owing to the necessarily wide spacing of the lights, the silhouette principle with direct illumination should be employed. This scheme provides a light background against which objects intervening on the ground

stand out in bold relief, like the daguerreotypes of the days of our forefathers. In some cases, prismatic refracting glassware of the bowl type can be used to good advantage to enhance the intensity of light immediately beneath the lighting unit, so securing more light directed on the road surface in the vicinity of the unit and a more nearly uniform light intensity over the entire, but limited, lighted area. The lighting of interurban highways is quite customarily performed with twenty to twenty-one lamps per mile.

A typical lighting fixture for country roads consists of a 20-inch radial wave reflector street-hood body furnished with a diffuser. Such a unit may be used with lamps as large as 600 candle-power, consuming approximately 350 watts.

Costs

No discussion of street lighting—even one as necessarily sketchy as this—can make any claim of being constructive without some mention of the all-important costs of street illumination. Obviously, no detailed figures can be advanced—so much depends upon the design of the lamp posts, etc.,—but some very general figures will serve as an indication of what the average installation of modern ornamental street lighting actually costs. Based on an average spacing distance of 70 feet for lighting standards, the installation cost per standard will average not far from \$100, and the yearly cost of operation and maintenance should not exceed \$50 or \$60 in normal times. Considered in the light of the benefits to a community in enhanced business value of well-lighted streets, the safety to its citizens, and the attractiveness of its streets after sunset, this would indeed seem a trivial sum to pay.

ACKNOWLEDGMENT:—Text and illustrations furnished by the courtesy of the Society for Electrical Development, Inc.

Motorization Reduces Complaints Regarding Garbage Collection

Under the contract system of garbage collection an average of 200 complaints were received each day, while under municipal collection with trucks and trailers only 10 are received each day from the 70,000 homes served in Indianapolis. One truck has proved to be the equivalent of three wagons and accomplishes in an hour and a half the equivalent of a day's work for a horse. Between 90 and 100 tons of garbage are collected daily.

Considerations Governing the Design of Pavements for Heavy Traffic

By **Prévost Hubbard**

Chemical Engineer, The Asphalt Association

THE load-carrying capacity of any type or design of pavement must of necessity be influenced by the support afforded the pavement from below. Such support is furnished by that portion of the earth directly below the pavement, known as the subgrade. The supporting value of natural subgrades varies enormously, as illustrated by the two extremes of muck or quicksand and solid rock. Most subgrades consist of soil lying between the extremes mentioned but still varying greatly in supporting value, depending not only upon type but upon their moisture content and degree of compaction. With very few exceptions, any well-compacted soil will of itself support the heaviest conceivable traffic if its moisture content is properly controlled and if it is protected by a structure which prevents the displacement of particles at its surface. The protective structure termed the pavement will then need to be only of sufficient thickness to afford such protection and at the same time itself withstand the various destructive agencies of traffic. For a given traffic, this thickness will depend largely upon the type of pavement used.

The bearing capacity of most soils, particularly the clayey types, decreases as their moisture content increases above a certain point. Although there is much yet to be learned regarding the comparative bearing value of soils, this fact is generally recognized, and various drainage methods are employed to control the moisture content of the subgrade. Proper drainage is the first essential for maintaining a dry subgrade, and measures taken to prevent access of water to the subgrade directly below the pavement are often more important than measures designed to remove accumulations of water in the subgrade. Some soils are so persistently retentive of moisture once absorbed that it is impossible to remove it with sufficient rapidity by any ordinary system of drains. Certain clayey soils belong to this class, and when all practical preventive measures in the way of drainage are apt to prove inadequate, it may well be ad-

visable to modify the character of the subgrade material. Thus, at relatively low cost a clay subgrade may often be greatly improved by mixing it with sand in exactly the same manner as in the construction of a sand-clay road. Such a mixture will not only retain less moisture than the clay but will possess a much higher supporting value than moist clay.

Uneconomical Design

It is now generally admitted that in the past too little attention has been paid to drainage in the construction of pavements outside of municipalities. At the same time there exists a marked tendency to increase the massiveness of design to a point far beyond that which is at present proving entirely satisfactory for heavy traffic in municipalities and in other places where subgrade conditions are favorable. This matter should receive the most careful consideration of engineers, as it points not only to the most logical but also the most economical solution of the design of pavements. It is evident that in many cases it will cost far more to increase the thickness of a pavement to such an extent that the load will be distributed sufficiently to enable a poor subgrade to support it, than it would be to change natural subgrade conditions so as to create a high supporting value for the relatively thin pavement.

The widespread use of rigid pavements, or pavements with rigid foundations, has been largely responsible for this trend in paving design, through too great dependence upon the bridging value of such rigid types. Right here exists a rather anomalous situation, for while many claims are made of the bridging value of rigid pavements, it is generally admitted that careful preparation of the subgrade is necessary to uniformly support these rigid types. As a matter of fact, it is impracticable to design a highway which will permanently bridge appreciable areas of a weak subgrade when subjected to modern heavy traffic.

In pursuing a policy upon which general

attention has once been centered, many who are interested in highway construction are apt to overlook the experience of others following different lines of development, and fail to profit by their experience. One of the most striking examples of this has to do with the flexible type of construction as represented by the asphalt base pavement, and this in spite of a number of valuable papers and discussions upon the subject by leading engineers. Citations of past and present experience in localities other than that of interest to the individual engineer apparently carry little weight once the majority concentrate on a given line of development, and it is difficult to focus attention on any other line for the time being.

Remarkable Facts

To state that considerably over 12,000,000 square yards of asphalt base pavement are now giving satisfactory service in California and Oregon, many of them 5 inches or less in total thickness and subjected to heavy motor traffic, and that some of these pavements have been in service for over 20 years with little or no cost for maintenance, should at least arouse some degree of interest on the part of eastern engineers. To further state that in such cities as Washington, D. C., Chicago, Omaha, Pittsburgh, Buffalo and Denver, there are in existence sections of bituminous base which have given satisfactory service for over 20 years, should also serve to dispel any illusion that the serviceability of this type is restricted to any given locality.

Service results should in themselves be conclusive, but explanations of such results are sometimes required before their full significance is grasped. It is true that theories have been advanced, but these have not been backed up by test data in such a way as to make them convincing. Some degree of cushioning effect under traffic has been claimed and admitted for the asphalt base as well as the wearing course, but few engineers have believed that a mineral aggregate cemented together with asphalt could possibly possess any slab strength or beam strength, at least to an extent comparable with the rigid type of construction.

The Effect of Impact

With this in mind, an investigation was begun under the direction of the writer assisted by W. E. Rosengarten, Traffic Engi-

neer of the Asphalt Association, to determine certain relations that exist between the rigid and flexible types of construction. Fortunately, through the very valuable work of the U. S. Bureau of Public Roads it has already been proved that impact and not dead load is the most destructive traffic factor to be taken into account in the design of modern highways. It was therefore decided to limit these investigations to a study of the effect of impact upon test specimens having thicknesses equivalent to those commonly used in the construction of highways. It was clearly realized in advance that it would be impossible to duplicate all the variable conditions under which impact is delivered to a pavement by traffic, and it was therefore decided to confine this study to the effect of pure impact as delivered by an iron bar falling from a relatively small height.

In order to obtain comparisons at two extremes of conditions, it was decided to construct and test slabs of various design upon a solid uniform subgrade and to test beams of the same design supported only by knife edges.

Testing Slabs on a Solid Uniform Subgrade

A plot of ground was secured and upon this was laid a 6-inch course of cinders thoroughly compacted by rolling. Slabs 3 feet square were constructed directly upon this subgrade, except that after the forms had been placed, the subgrade within the form was leveled up with a very thin layer of sand so that each specimen would have a uniform thickness throughout. Portland cement concrete slabs were cast 4 and 6 inches thick, of a 1:3:6 mix. These were cured under a cover of moist sand after they had set. Some of the concrete slabs were then covered with from 2 to 4 inches of coarse graded aggregate asphaltic concrete, and some with sheet asphalt with and without a binder course. In addition, slabs were constructed of asphaltic concrete base mixture and covered with either asphaltic concrete surface mixture or with sheet asphalt so as to produce total thicknesses directly comparable with the Portland cement concrete base specimens. At the same time corresponding sets of beams 4 feet long and 10 inches wide were constructed of the same type and thickness. In general, the specimens were tested when the concrete was 28 days old, although in a few cases they were

slightly older when for one reason or another it was found impossible to keep up with the testing schedule which had been planned.

All slabs were tested where they had been cast, by means of a machine which was designed and operated so as to drop a 125-pound iron ball upon the center of the upper surface from a height of 6 inches at the rate of about 30 blows per minute. In all cases a specimen was considered to have failed when the first crack appeared. Cracks in the Portland cement concrete were invariably first noted developing on one or more sides of the specimen from the plane of contact with the subgrade. Under continued impact these cracks traveled to the upper surface of the monolith and then across the upper surface toward the center. The all-Portland cement concrete specimens broke into two to four large fragments shortly after the first crack appeared, while similar slabs with an asphalt top showed no cracking of the top after the base had failed. The results obtained on check specimens were in some cases erratic, in others quite close together. By averaging results, however, the general trend is apparent and is closely borne out by results obtained on the beam specimens.

The following diagram shows the resistance to impact of the various types of slabs as measured by the number of blows required to produce failure. The dotted extensions of the asphalt tops on slabs with a Portland cement concrete base show the number of blows at which the test was stopped, no failure of the top then being apparent.

Testing Beams Supported by Knife Edges

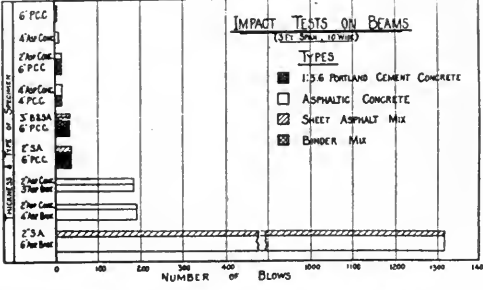
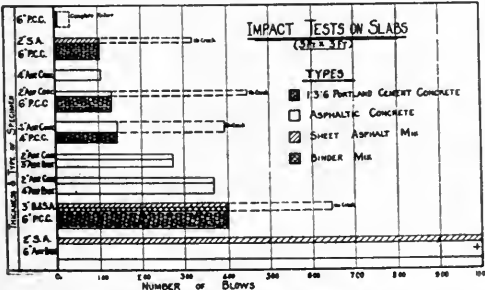
The beams were tested upon steel knife edges 3 feet apart with the same machine used for testing the slabs, but with a 50-pound iron ball dropped from a height of

1½ inches at the center of the span at the rate of about 50 blows per minute. The number of blows required to produce the first crack was recorded as point of failure. In all beam tests complete failure occurred within a very few blows after a crack appeared. The results of these tests are shown in the second diagram in the same manner as the slab tests.

In considering these diagrams no attempt will be made to draw conclusions based upon a comparison of absolute values as here shown; in fact, it is frankly admitted that such a course would be unwise until many more test data are available. It is believed, however, that the general similarity in trend of the results obtained in both the slab and beam tests are highly significant and point to interesting facts. What is clearly apparent for conditions under which these specimens were tested may be summed up as follows:

Asphaltic mixtures develop very decided slab and beam strength as measured by their resistance to impact. The all-asphalt type of slab and beam appears to offer considerably more resistance to impact than an equivalent thickness of 1:3:6 Portland cement concrete, considered either as an integral structure or as a base for an asphaltic top.

It is recognized that, unsupported by practical service results, deductions drawn from these tests might not be conclusive as applied to the design of highways for heavy traffic. They do, however, help to explain the remarkably satisfactory service record of the millions of square yards of 4- and 5-inch asphaltic concrete pavements in California and Oregon, and point the way to a more rational development in the design of highways in other localities. In summing up the substance of this paper, there are a few points which the writer wishes to em-



RESULTS OF IMPACT TESTS ON SLABS AND BEAMS OF DIFFERENT MATERIALS

phasize:

Points of Emphasis

1. Any rational design of highway should take into account the fact that the subgrade must ultimately take the weight and shock of traffic as transmitted through the pavement, and practically any reasonable dry subgrade will do this if it is compacted and its surface is protected from displacement. Careful attention to subgrade preparation and drainage is therefore the first essential to be considered.

2. The asphaltic concrete pavement is highly resistant to impact, which is recognized as the most destructive traffic factor, and under impact develops as a single unit relatively high slab and beam strength.

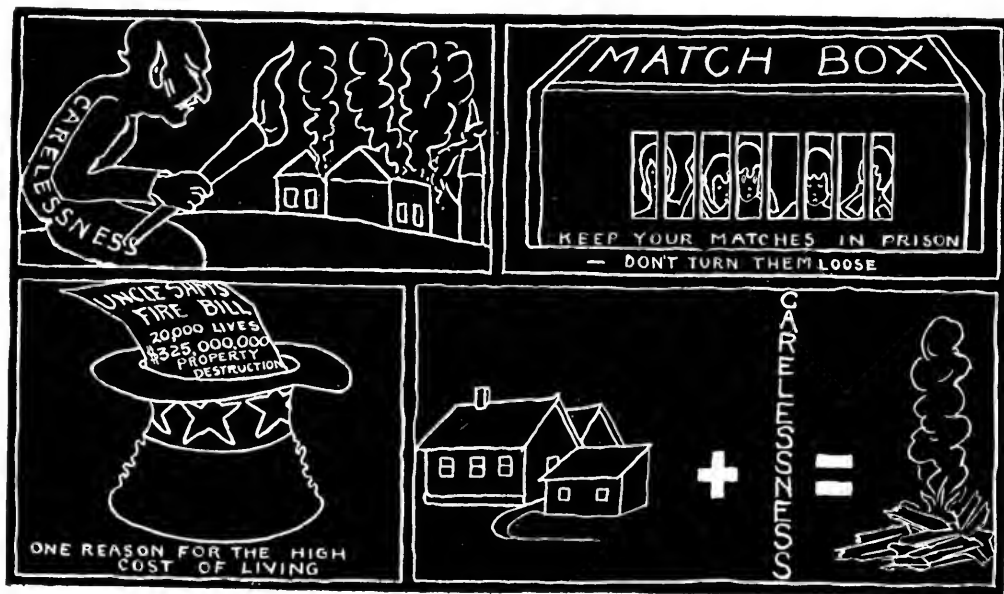
3. It is manifestly uneconomical, if not impracticable, to adopt a design of highway which will permanently bridge appreciable areas of weak subgrade. While the asphalt type develops bridging action to an appre-

ciable extent, it will of itself constantly seek to maintain contact with the subgrade at all points and thus reinforce itself with the maximum supporting value of the subgrade. The rigid type of pavement or base cannot do this because of its inherent characteristics. It is therefore almost sure to crack eventually where appreciable areas of subgrade fail to support it uniformly.

4. Both the service history of asphalt base pavements and the test data here presented indicate that under given conditions it is not necessary to adopt as massive a design for the flexible type of base as for the rigid type. It is difficult for engineers who have had no opportunity to observe the asphalt base pavement under heavy traffic to think of it in terms of less thickness than the rigid base, but in the light of present experience such consideration appears to be entirely warranted.

ACKNOWLEDGMENT.—From a paper presented before the Engineers' Club of Philadelphia, December, 1920.

Teach Fire Prevention in the Schools



Courtesy of the National Board of Fire Underwriters

BLACKBOARD CARTOONS FOR THE SCHOOLROOM

Almost every schoolroom contains pupils with some talent for drawing. The simple cartoons shown above may be copied by them upon the blackboards and will aid in impressing the lessons of the day.

The Municipal Refuse Destructor at Montevideo, Uruguay

A Successful Experiment in New Principles and Design

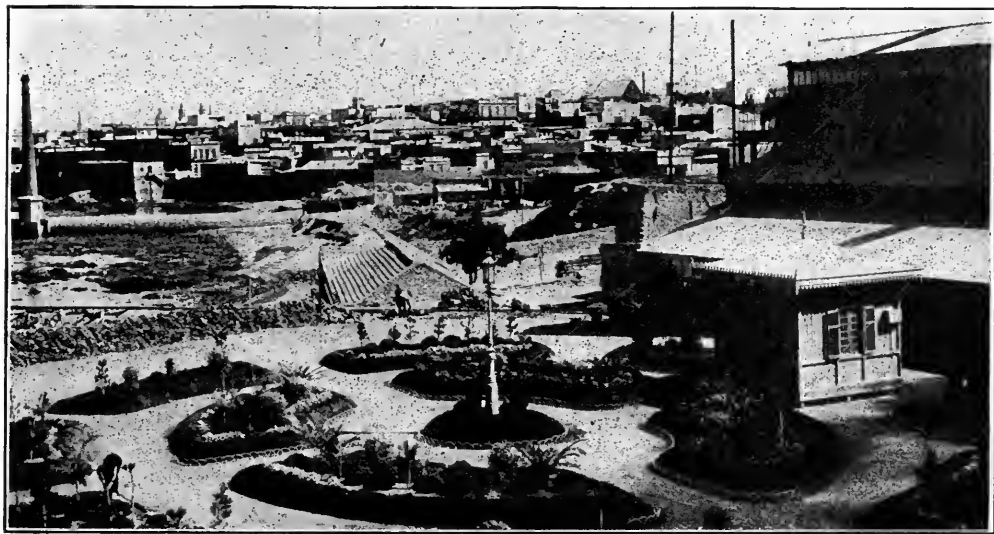
By Robert Balmer

Sanitary Engineer, New York and Buenos Aires, Argentine

IN 1915, after an open competition in which a number of the best-known European destructor firms had taken part, a Special Committee of 19, including the Mayor of Montevideo, Uruguay, all the Commissioners of Department, and a number of prominent engineers and sanitarians, recommended the erection of a Balmer refuse destructor. After the preliminary surveys and the preparation of the site, the work of construction was begun, and it was concluded within five months, on Au-

antee of 60 long tons per battery was soon exceeded by normal operation at 100 long tons, with reserve capacity to meet any emergency. The public needs are met by two batteries. They proved themselves capable of dealing with the city's whole output of refuse—garbage, ash, rubbish and street sweepings, together with a number of special services, such as cremation of dead animals, condemned food, commercial residuals, etc.

The destructor station occupies a part



LOOKING TOWARD THE RESIDENTIAL PORTION OF MONTEVIDEO FROM THE DESTRUCTOR

Note the proximity of high-quality residences

gust 25, 1915. One month more was taken up with drying out and warming up the batteries; then came an official test of two months' duration, under the supervision of the author, which demonstrated a normal excess of 66.6 per cent over the contract stipulations.

Description of Plant

The plant consists of three batteries of three fire-grates each. The original guar-

antee of the block between Ejido and Cuareim Streets, on a bluff overlooking a handsome boulevard or driveway that skirts the river-side—a conspicuous position, within seven blocks of the City Hall, and calculated to put to the severest test the possibility of nuisance from this system.

Regular service under municipal management began January 1, 1916, immediately after termination of the official trials above mentioned. Early in 1917, the City Engi-



THE FRONT OF THE BATTERY OF FURNACES AT THE MONTEVIDEO REFUSE DESTRUCTOR

neer, H. Millot-Grané, issued the official report for the preceding year. Some brief extracts from that report will demonstrate the character and extent of the service rendered during the first year's working. The report says:

"In table A will be found a resumé of the amount and quality of garbage and refuse received by the destructor during the year 1916, the first year of service. This table shows that the plant, although only a provisional structure built only to test the efficiency of the system, received and destroyed without the slightest inconvenience all the garbage and refuse regularly produced by the city.

"On the other hand, the elimination and destruction of the street sweepings and fish residuals bear testimony to the high crematory power of the batteries."

A GARBAGE AND REFUSE DESTROYED 1916

Cartloads	Character	Total Weight
57,426..	Household	64,443,610 Kilos (141,775,942 lbs.)
10,415	Street Sweepings.....	1,432,250 Kilos (3,150,950 lbs.)
2,175	Markets.....	2,176,000 Kilos (4,787,200 lbs.)
593..	Military Barracks.....	296,000 Kilos (651,200 lbs.)
373..	Fish Residuals.....	186,500 Kilos (410,300 lbs.)
174..	Hospitals.....	174,000 Kilos (382,800 lbs.)
18..	Private Individuals....	9,000 Kilos (19,800 lbs.)
56..	Residuals from the Port	114,000 Kilos (250,800 lbs.)
152..	Various.....	152,000 Kilos (334,400 lbs.)
71,383	Cartloads with.....	68,983,360 Kilos (151,763,392 lbs)

"Table B, complementary of the preceding, details some unexpected services rendered by the plant. In this direction, during the present year, an effort will be made to extend these services, making them available to many public and private institutions and, in general, to all those establishments which are interested in quickly getting rid of such refuse as they produce in large quantities."

TABLE B SPECIAL SERVICES

Source	Objects Incinerated
City Dog-Pound.....	2,980 Dogs..
Animal Sanitary Police.....	45 Sheep
" " ".....	12 Cows
" " ".....	1 Horse
Medical Faculty.....	13 Animals,
	Various
Municipal Chemical Laboratory..	9 Cases of
	Foodstuffs
Banks.....	\$5,664,555 in notes,
	etc.
National Telegraph.....	6,270 kilos (or 13,794 lbs.) of Duplicates, etc.

"In order to complete these brief notes on the incinerating capacity of the Montevideo destructor, as exhibited during its first year of working, and to give an idea of its intrinsic value, Table D is attached, in which may be seen its capacity exhibited in comparison with the incinerating stations of the greatest scientific importance as yet known, without excepting that of Hamburg, which must be taken as the most considerable effort of modern sanitary technique on the matter of garbage and refuse disposal.

"The above consideration may be concluded by stating that, according to the technical report officially issued under date of September 19, 1916, by the Institute of Industrial Chemis-

TABLE D		INCINERATION PER UNIT			1916
City of	System	Number of Units	Cells per Unit	Daily Output per Unit	Cost of Construction per Unit
Weisbaden	Dorr	6	1	19,500 Kilos (42,900 lbs)	\$13,666
Frankfort	Herbertz	6	4	30,000 Kilos (66,000 lbs)	\$52,900
Furth	Humboldt	2	1	27,500 Kilos (60,000 lbs)	\$17,250
Milwaukee	Heenan	3	4	80,000 Kilos (176,000 lbs)	\$69,000
Hamburg	Udhe	12	1	44,000 Kilos (96,800 lbs)	\$21,850
Montevideo	Balmer	3	3	*90,000 Kilos (198,000 lbs)	\$21,666

try, the clinker and ash of the Montevideo destructor show a perfect incineration of the garbage and refuse, or, which is the same, an absolute elimination of all organic matter.”

“And Table F exhibits the economy with which the plant is operated. In making up this last table, we have taken as basis the actual working budget of the plant, which reaches \$28,800 annually, and the cost of amortization and interest on a capital of \$65,000, covering the cost of the plant.”

“It is desirable to state here that this low cost of construction and operation is due to the

mechanical simplicity of the Balmer system. The complicated apparatus and devices which form part of all known systems of destructors do not exist in our establishment. Situated at a low level, the natural action of gravity carries the garbage and refuse down to the fire-grates.

“Another characteristic worthy of mention, as representing the economic nature of our installation, is its central location with respect to the service of collection. The distance of seven kilometers, from the centre of the city (City Hall) to the disgraceful garbage dump

TABLE F		COST OF OPERATION PER 1000 KILOS INCINERATED ANNUALLY (1916)		
City of	System	Annual Cost of Operation with 10% Int. & Mort.	Quantity Incinerated Annually	Operating cost per 1000 Kilos (or long ton)
Zurich	Horsfall	\$30,820	20,000 Long Tons	\$1.54
Milwaukee	Heenan	81,650	54,000 “ “	1.51
Frankfort	Herbertz	67,160	46,500 “ “	1.45
Wiesbaden	Dorr	19,205	17,000 “ “	1.13
Furth	Humboldt	11,040	12,000 “ “	12,000 0.92
Hamburg	Udhe	71,300	100,000 “ “	0.71
Montevideo	Balmer	35,000	66,000 “ “	0.53



WORKMEN'S REST ROOM AT THE MUNICIPAL REFUSE DESTRUCTOR

of the Buceo, was reduced, in virtue of the new station, to 800 metres. And, in the first year of working, it has been proved that, owing to this more favorable location, it would be possible to reduce to one-half the expense of collection and cartage, and thus effect a monthly saving sufficient to cover the total present cost of working of the station, viz., \$2,400 monthly, and to cover likewise the interest and amortization on the capital employed in construction."

Up to the end of 1920, the destructor station has operated without developing its own power. It has now been decided by the municipality to install boilers and an electric generating plant to utilize the heat produced by the furnaces. By the third quarter of the current year, the new power service should be in full operation. It is estimated that each battery will develop a minimum of 400 kilowatt capacity.

Principles of Operation

A brief reference may now be permitted to the underlying principles of the Balmer destructor. These had already been put into practice in the 100-ton destructor of Flores, Buenos Aires; in the 1,000-ton destructor of the Quema, Buenos Aires, and a dozen smaller destructors in that and other Argentine cities. In the Montevideo plant, the same principles have the advantage of the foregoing practical experience, aided by more careful designing and a more esthetic setting, expressive of the new social status of the service.

Fundamentally, and especially in dealing with semi-tropical refuse, where ash is practically non-existent and where garbage constitutes an excessively high percentage, the Balmer destructor depends for its sanitary efficiency on the development and utilization of hitherto unappreciated and neg-

lected elements in the refuse itself. By fermentation of organic constituents, displacement and expulsion of accompanying moisture, volatilization of hydrocarbons, and even oxidation of metals,—all aided by the application of waste heat from the combustion chamber,—a molecular readjustment is effected, which transforms the character of organic refuse to a combustible; its ignition becomes easy, and it develops high temperatures. It is true that, under this treatment in the pioneer installations, some unusual phenomena presented themselves: spontaneous combustion of the refuse in storage, and the production of explosive gaseous mixtures, with violent dilatation in the air-flues and in the furnace itself. These phenomena, while exceedingly inconvenient under the conditions of the first installations, were very convincing signs of the existence of considerable caloric potentials in ordinary city refuse, which only required adequate measures for their utilization to insure a perfect sanitary service and an abundant source of power.

The Collection System Used

It may be noted here that in both capital cities above mentioned, the improvement in the service of final disposal of refuse reacted automatically in the creation of a higher standard for the vehicles of collection and transport of the refuse. A covered type of van was at once developed, which effectually kept the refuse out of sight and provided shelter for the driver in all weathers. The service became less an ocular and olfactory offense, and soon gained the toleration and then the respect of the average citizen.

Assessments for Street Sprinkling

IN Hartford, Conn., it is customary to assess the cost of street sprinkling or oiling or flushing, as the case may be. The cost for this work for the fiscal year ending March 31, 1920, was \$61,538.61. The rates charged were 6 cents per foot frontage for paved streets flushed every night and 4 cents for paved streets flushed less than every night, and 4½ cents for macadam streets. In all, 111 miles of streets, or 222 miles of street frontage, are figured in the assessment. The assessment as prepared

by the Department of Engineering, filled 700 legal cap typewritten pages, which listed 13,448 names of property owners. Of late years it has been the custom to substitute oil for water on all macadam streets, and especially where sand is added. The mat which is formed protects the road and many times does away with the necessity of redressing it. This cost might better be charged up to maintenance instead of being assessed against the individual property owners.

Aeroplane Map Used by City Planners in Dallas

By Major Edward A. Wood

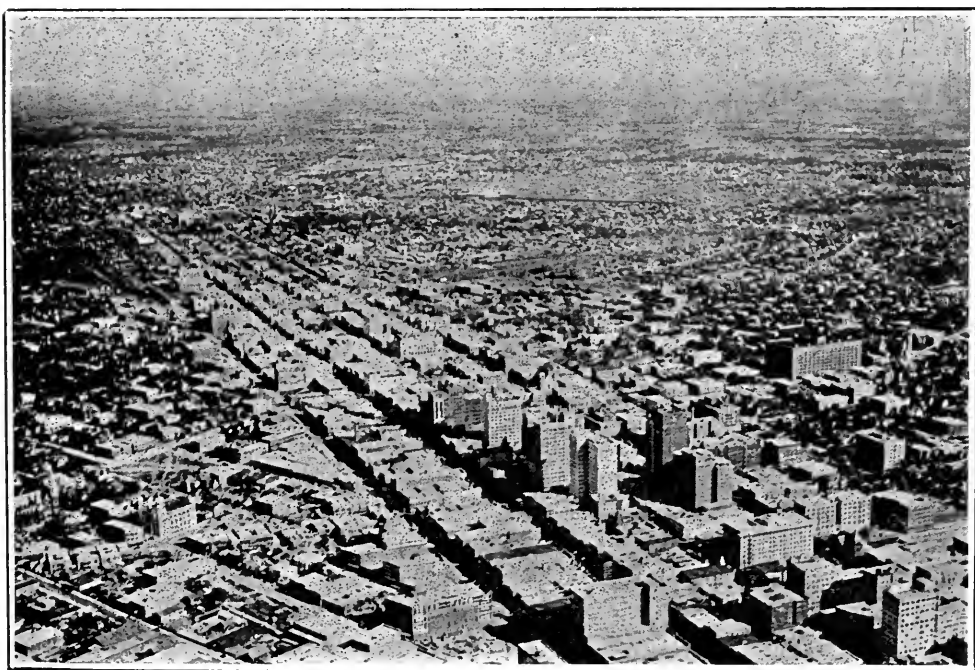
IN order that the city planner may make his studies, many kinds of maps and drawings are necessary to show the relation of one section of the city to another. Natural as well as artificial features must be shown—watercourses, hills, valleys, wooded areas, railroad lines, streets and highways, buildings, etc. Usually these features are delineated by means of a topographical map, requiring months and even years to make. A photograph, however, shows much more clearly than any map both natural and artificial features, and it is here that the map made by aerial photography surpasses any map drawn by hand, because it shows the landscape with its innumerable details and enables the city planner to visualize the scene.

In the zoning of a city, the "mosaic" or aeroplane map is particularly valuable, because it shows so clearly the existing use of the land, the height of buildings, shadows cast by the very high buildings, the rela-

tion of the streets and highways one to another, the absence of direct connecting streets, the railway lines, terminals, industrial districts, etc. Taking it all in all, probably there is no one single map of as much value to the city planner as the "mosaic."

Making the "Mosaic"

Dallas is particularly fortunate in possessing such a map. In March, 1920, when city planning began to assume definite form in this city, Mayor Frank W. Wozencraft and Fire and Police Commissioner L. E. McGee asked Colonel Burwell, Commandant of Love Field, if a map of Dallas might not be made by aviators for the use of the City Planning Commission. The matter was finally arranged, and a De Haviland bomber, piloted by Lieut. M. J. Plumb, winner of the New York to Toronto race, arrived in Dallas early in April. Lieut. C. H. Billet, Photographic Officer, U. S. Air



AEROPLANE VIEW OF DALLAS, TEX.

Service, after experimenting with the density of the light, etc., selected an altitude of 6,000 feet and began the making of the big map; 378 plates in all were exposed, and the taking of the pictures was limited to the hours between 10 A. M. and 2 P. M., to avoid shadows. Prominent streets were selected as guiding lines, and the giant bombing plane, adapted to a more peaceful occupation than bombing, flew back and forth along these parallels, accurately recording every detail of the landscape.

One of the greatest advantages of aerial photography is the rapidity with which the work may be done, provided bad weather does not interfere. And yet the task is a difficult one for the pilot, for the ship must keep an even pull and a direct course. Furthermore, the same altitude must be maintained, else the pictures will not have the same proportions.

After the prints have been made comes the tedious part of the task, for every print must be carefully trimmed to fit its neighbor

and pasted so as to maintain a proper scale. In this manner the "mosaic" is made, the name being derived from the many pictures that go to make up the completed map.

The Dallas map is about 5 feet by 8 and includes 52 square miles of territory. This covers areas that are not as yet included within the city limits, but which some day will be occupied by the city. The map will be valuable in projecting new additions.

Primarily the map was made for the City Planning Commission, to be used in its work. It will first be used in connection with the zoning of the city, and later in planning major and minor street systems, street widening and street extension projects, relocation of freight terminals, the flood control of the Trinity River, location of parks and boulevards, and many other city improvements. Already the Fire Commissioner has used this map to locate several new fire stations, and, according to George E. Kessler, City Plan Consultant for Dallas, the uses of such a map are legion.

Atlanta Children at Play



"THE OLD WOMAN WHO LIVED IN A SHOE"

With an area of only 26 square miles, Atlanta, Ga., has 18 public parks and playgrounds

Housing Conditions in American City Schools

A REPORT on the finding of a national survey on housing conditions in American city schools has just been published. This survey is the second in the series of studies of conditions in urban schools which is being conducted by the National Committee for Chamber of Commerce Coöperation with the Public Schools, and the American City Bureau.

Four hundred and twenty-nine cities have participated in this survey. The purpose of this wide coöperation between civic and commercial organizations with city school officials is to assist in the study and development of the local school program based upon carefully assembled facts. When the American people come to a full realization of the present emergency they can be counted upon to provide the support necessary for the maintenance and development of our public school system.

Public school enrollment, size of classes, school buildings and grounds, and local taxation in support of schools vitally affect the efficiency of our public schools. The results of this inquiry upon all of these matters will be found in this report. The findings presented here show that we have failed to provide education for all of the youth of America, and that there are tens of thousands of children now housed in old, unsanitary, dangerous buildings. The following is a summary of this survey.

Summary of Report

Attendance

1. The report is based on facts given by 429 cities out of about 950 cities in the United States whose population exceeds 8,000. The population of the cities reporting is 70 per cent of the total population of this group.

2. A growth of 21 per cent in the school population of these cities in six years has greatly increased the demands upon school plants; 19 per cent of all these children leave school before they are 14, and 64 per cent before they are 16 years of age. If this growth in school population continues, or this heavy elimination can be checked in any considerable degree, the congestion in the school plants will become so acute as prac-

tically to block the carrying out of the educational program.

Size of Classes

3. Lack of building accommodation is mainly responsible for large classes: 40 per cent of all elementary school classes have 40 or more pupils each; 20 per cent of all kindergarten classes have more than 50 pupils; 11 per cent of all junior and senior high school classes exceed 35 pupils each. In such large classes the individual pupil cannot be given the care and personal instruction to which he is entitled.

Playgrounds

4. Very little playground space is provided for city school children. Half the children reported have less than a 6 by 6 foot plot each for their recreational and athletic activities. Only 19 per cent of them have as much as the standard minimum of 100 square feet. The most favored child of the lowest fourth has only 12 square feet, less than is allotted to him in the classroom.

Buildings

5. Half the children reported are housed in buildings, with their additions, erected more than 22 years ago. One building of every four now in use was built before 1886. Most of the buildings housing half of these children are unsanitary, inadequately lighted, badly heated and ventilated, and do not have rooms that can be converted properly into the shops, laboratories and gymnasiums which are essential to the kind of education now demanded in progressive cities.

6. A large number of the school systems have too many small buildings either for economy of administration or effective grouping of the pupils. Half the elementary school buildings do not exceed ten rooms each, and one-fourth of them have six rooms or fewer.

7. Very few school buildings are fire-proof: 44 per cent of all buildings reported have brick or masonry walls, but the material of all floors, ceilings, partitions and stairways is combustible; 21 per cent are

wooden frame buildings. At least 30 per cent of the children in these cities are housed in buildings of more than one story of these two types just described. Only 5 per cent of the total number of buildings are of the types of construction usually called fire-proof.

8. Although this large percentage of school buildings are non-fire-proof, only a small number have fireproofing elements to lessen the fire hazard to the children. In only 18 per cent of the two poorest types of buildings is the heating apparatus in a fire-proof enclosure. At least 25 per cent of the buildings of these two types are of two or more stories and do not have a fire-escape. Thirty-nine per cent of these two types are without fire-extinguishers, and less than 10 per cent of them have automatic sprinkler equipment in any part of the buildings. Only 11 per cent have automatic fire alarms. Such facts as these demonstrate the existence of a real menace to the children of these cities.

9. Thousands of children in these cities are housed in makeshift buildings unsuited to school use, or are on half-time because of lack of space: 130,000 children are using portables; there are 43,000 in rented dwellings, stores and lofts; 55,000 are in annexes;

8,000 are in halls and corridors, and 3,000 in attics; 31,000 are in basements which are inadequately lighted and more than 3 feet below the ground level; 248,000 children in these cities are on half-time. Seventy-five per cent of the cities report one or more of these types of congestion. Over 600 new 30-room buildings are required to correct this one phase of congestion in the schools of these cities.

Expenditure and Tax Rates

10. These cities vary widely in their tax rate for school purposes and in their annual expenditure per pupil attending school. The median tax rate allowed for school purposes is \$15 per thousand of the assessed valuation. Half of these cities allow a rate between \$9 and \$25 per thousand. The range for all cities reporting is from \$1.60 to \$60. The amount of income from local taxation for each pupil attending any kind of school in the city last year ranges from \$16.50 to \$132. The median for all cities reporting is \$56.89. The middle half of these cities expend between \$45 and \$71 per pupil.

EDITORIAL NOTE.—Copies of the report can be obtained from the publishers, the American City Bureau, Tribune Building, New York, N. Y.

The Unifying Influence of Community Music



WITH A POPULATION OF 2,000, LINDSBORG, KANS., PRIDES ITSELF ON A COMMUNITY CHORUS OF MORE THAN 500. SINCE 1882 THE RENDITION OF HANDEL'S "MESSIAH" HAS BEEN A YEARLY FEATURE IN THE TOWN. THE ANNUAL EASTER FESTIVAL IS ONE OF THE MOST IMPORTANT MUSICAL EVENTS IN THE MIDDLE WEST. SINGLE FAMILIES ARE REPRESENTED BY THREE GENERATIONS IN THE CHORUS

Forward Steps

Reported to **THE AMERICAN CITY**
by **Municipal Officials & Department Heads**

City Managers

Municipal Water Plant Helps Pay City Manager's Salary

WESTERVILLE, O.—This city adopted the city manager form of government by a charter which became effective in January, 1916, and the present manager has held office since September, 1917. Under this plan of city administration a very satisfactory record has been made by the municipally owned water-works and the light and power plant.

During the past year the first big step toward carrying out the new water-works program was completed, namely, the construction of a 20-foot-diameter reinforced concrete well, 31 feet in depth, laying about one mile of 6-inch cast iron force main, and erecting a 200,000-gallon steel water-tank and tower. This tower, shown in the accompanying photograph, was furnished and erected by the Pittsburgh-Des Moines Steel Company.

The policy of the present administration has been to make as many improvements to the utilities as possible from the earnings. When the city manager administration took office in 1916 it inherited several thousand dollars of indebtedness in the water and light departments. The close of the year 1920 shows that the earnings of these plants have paid for approximately \$35,000 worth of improvements, enlargements and repairs, and that meanwhile the operation of the utilities has been kept strictly within their incomes.

Although the population of Westerville (3,000) has increased by only several hundred during the last five years, the excellent service of the municipally owned utilities has more than doubled the number of light and power consumers, which has necessitated considerable outlay to provide for

the growth. This has been met from the department's income. It is believed that the light and power is cheaper to the consumer than that of the average municipally or privately owned utility.

The writer is heartily in favor of municipally owned water, light, gas, sewage and other utilities, provided they are properly managed. Even small municipalities should be able to employ an expert manager and pay at least three-fourths of



THE CONICAL BOTTOM AIDS MATERIALLY IN SETTLING SEDIMENT TO BOTTOM OF RISER PIPE OR MUD DRUM

his salary and all the salaries of his assistants from the earnings of its utilities, besides having the benefits of this executive's time and experience for the other departments of the corporation. The water and light department of Westerville pays \$2,025 toward the city manager's salary.

Without a paying water and light plant, Westerville could not employ a city manager and keep within a reasonable tax rate.

R. W. OREBAUGH,
City Manager.

Departments of Education

Teaching Accident Prevention

DETROIT, MICH.—Two years ago the Board of Education of Detroit, upon recommendation of the Superintendent, made safety education one of the subjects of the school curriculum. The first year was spent in an attempt to develop this subject through a part-time supervisor and a committee of teachers. At the end of the first year the social importance of the subject was more fully realized and a full-time supervisor was appointed. The alarming and increasing number of accidents to school children on the streets of the city served to emphasize the need of work along this line.

To the Department of Safety Education was assigned the business of studying the causes of accidents to children in the streets, playgrounds and homes, of building up a course of study to teach accident prevention in every grade, of organizing all the safety work in the public schools, and of co-operating in every possible way with the Police Department, the Fire Department, and with other civic activities concerned with public safety and welfare. Without text-books or precedents to follow, the Department of Safety Education made a careful study and analysis of the accident reports furnished to the Board of Education by the Detroit Police Department. These reports not only revealed the seriousness of a situation that in twelve months caused the injury or death of 1,097 school children in the city, but furnished valuable, definite information about the causes and types of such accidents. They showed, for example, that the younger children need careful instruction and frequent practice in safe ways of crossing the street; that foreign children are in many cases the accident victims; that accidents to boys from twelve to fourteen years of age are usually the result of bicycle riding or hitching; that instruction in home safety is greatly needed to reduce the number of preventable accidents and deaths caused by falls, scalding, firearms, etc.

Experiments were carried on in various grades and schools in order to find out how

to teach safety in a manner suited to the natural interest and ability of the children and helpful to the teachers. Every teacher was found to be attempting to teach accident prevention in some way or other, and many of the teachers have contributed useful ideas. As a result of these experiments a course of study has been prepared and is now a part of the curriculum of the public schools from the kindergarten through the eighth grade. It covers the principles of accident prevention, fire prevention, health conservation, first aid, and community civics, adapted to each grade. Safety is not taught as a separate subject and does not impose an additional burden upon the teacher, but safety topics are suggested for use in the regular subjects of the classroom, and are welcomed by the teachers, since they provide motivation and appeal to the interest of the children in their various studies—language, drawing, civics, arithmetic, and especially dramatics. These topics avoid all morbid features of accidents and emphasize the constructive side of safety.

In the lower grades, games are used to teach the children the right way to cross the street and give them a working knowledge of the rules of the road. Starting with the traffic policeman and the pedestrian, both represented by children, the game is gradually elaborated to include automobiles, trucks, street cars and motor-cycles. The front part of the school represents the main avenue nearest to the schools, aisles the side streets, and chalk marks on the floor represent the curbs, street car tracks, and safety zones. Some children in their seats are "tall buildings with the traffic going on around them." Semaphores for the use of the younger children in their traffic games are made by the older boys in the manual training classes. One teacher of a first grade asked her pupils to request their parents to look out for little boys and girls who might be waiting to cross the street, and take them safely across. The next time the children played a traffic game, every one wanted to be a "father taking some little child across the street." Thus very early the idea of service to others is developed, and in many other lessons the same thing occurs, without conscious effort on the part of the teacher to emphasize that objective.

The teaching of accident prevention lends

itself admirably to the various forms of language work, oral and written composition, letter writing, and reading. The saving of life is a subject that children are eager to talk about. They discuss accidents that have come within their experience, describe ways of avoiding such accidents, tell what they are doing to help safety, compare safe places to play in with unsafe places, safe toys with unsafe toys, all with such lively interest that the teacher's only difficulty is to direct the discussions into the most helpful channels, and emphasize the constructive side of safety.

Drawings by kindergarten and first-grade children illustrating safety at the street crossing show that the children have a clear idea of the four corners, the traffic policeman who helps pedestrians across, and people waiting for the signal, and some children even add an automobile or two to their drawing. Although in these crude sketches other persons are represented without arms, the policeman never fails to be provided with these useful appendages, and with blue uniform, buttons and badge as well. In the minds of kindergarten children the idea of a uniform is already established and they may be given a conception of the other uniforms with which they are familiar, that of the postman, fireman, street cleaner, etc. In this way an intelligent and helpful attitude toward public service is developed, and the foundation laid for good citizenship.

The course of study provides for safety clubs and organizations for safety by the pupils themselves, for coöperation with the Fire Department, in efforts to reduce the fire loss, which in Detroit amounts to more than four million dollars annually, and for participation by the children in all civic enterprises.

The records of the Detroit Police Department show the results of a year of accident prevention work by the Department of Safety Education:

	Sept. 1, 1918 to Sept. 1, 1919	Sept. 1, 1919 to Sept. 1, 1920
Fatal accidents to school children	96	48
Serious accidents to school children	164	102
Minor accidents to school children	837	439
Total	1,097	589
HARRIET E. BEARD, Supervisor, Department of Safety Education.		

Public Works Departments

Auxiliary Garbage-Collection Equipment on Ash Wagons

WINNETKA, ILL.—In this city garbage and ashes were formerly collected in separate equipment. It was noted, however, that the amount of garbage collected on any one route during the winter months was considerably less than the amount collected on the same route during the summer months. The absence of alleys in Winnetka made it necessary to work the two equipments together, namely, one ash wagon and one garbage wagon, in order to operate with only two men on each route. It was found that by fitting each ash wagon with the auxiliary carrying equipment shown in the illustration it was possible to do without garbage carts entirely during the winter months, thus saving the hire of five horses per day.



THIS SIMPLE EQUIPMENT MAKES IT POSSIBLE TO DO WITHOUT SPECIAL GARBAGE CARTS IN WINTER

The construction of the equipment is very simple, as it consists only of two metal containers of heavy galvanized sheet iron with reinforced corners and edges, supported by an angle-iron rack hung from the top of the ash wagon and clipped securely to the rear axle. This equipment has worked out very successfully and merely requires the proper bracing of the rear of the wagons used so that they will not be injured by the weight of the garbage and the containers.

W. A. GIBBON,
Superintendent of Public Works.

Public Welfare Departments

Recreational Activities Coördinated

HOUSTON, TEX.—The boards of Community Service and of the Recreation Bureau of the Department of Public Welfare of the city of Houston were recently consolidated. They made a combined appeal to the Mayor and Council that a full department of the city government be created to supersede the previously existing bureau. This request was granted on January 24, and an ordinance establishing the Department of Recreation and Community Service was passed.

The ordinance creates a Board of Commissioners of eleven members, of which the Superintendent of Schools, the Superintendent of Parks, the City Librarian, the City Health Officer, and the Director of Public Welfare are ex-officio members. Thus the recreational activities of the city are coördinated.

The ordinance provides that all children's playgrounds, indoor recreation centers, play fields, gymnasiums, public baths, comfort stations, and other recreational properties now owned and controlled by the city of Houston, or that may hereafter be established or acquired by the city, shall be under the control and management of the new commission. The power of the School Board or the Park Board to veto the use of any of their respective buildings or grounds for recreational purposes is preserved to those boards. The ordinance also gives power to the new commission to conduct recreational activities on or in private prop-

erties with the consent of the owners. The new department has power to receive donations, legacies, or bequests for the improvement or maintenance of its playgrounds or recreational properties.

Having secured the creation of the new recreation commission, the former boards of the Recreation Bureau and Community Service then organized themselves into a new voluntary association to be known as the Recreation and Community Service Association of Houston, for the purpose of supplementing municipal appropriations from voluntary contributions, in order that a larger consolidated and well-coördinated program of public recreation may be developed in this city.

H. WIRT STEELE,
Director of Public Welfare.

Recreation Departments

A Recreational Center Which Teaches Self-Government

ROCHESTER, N. Y.—A plan for community work aimed at developing boys into useful citizens is being worked out by a group of Rochester citizens who have enlisted the aid of educational authorities. Business men who are backers of the plan have insisted on remaining anonymous.

An evening recreation center for boys from 12 to 15 years old, in which instruction will be given not only in games and athletics, but also in self-government, has just been opened as an adjunct to the public night schools. This recreation center plan is an experiment in Americanization. The school in which the center is being conducted is in one of the foreign districts of the city. The work of this center is under the immediate supervision of the director of the department of physical education of the public schools. Classes will be held for two hours in the evening once a week.

Boy students at both day and night schools, and working boys, will be admitted to the classes. They are divided into three groups, according to age, and each evening is divided into four periods so that individuals may take part in all four classes each evening.

The first class takes up gymnasium work,

with training in basketball, mass athletic work to fit the boys for later competition, also wrestling and mass games of many sorts which have proved effective in training boys both mentally and physically. The second class is held in the game room and plays chess, checkers, shuffleboard, and pool. The third class is known as the self-government group, and gives training in parliamentary law, the conduct of meetings, and extemporaneous speaking, all of which will aid in turning out good American citizens. The practical application of what is learned to the problems arising out of the organization of the center as a whole, is the aim of this class. The fourth class takes up a special activity each week, such as Boy Scout work, motion pictures, Safety First, thrift, etc.

HERMAN J. NORTON,

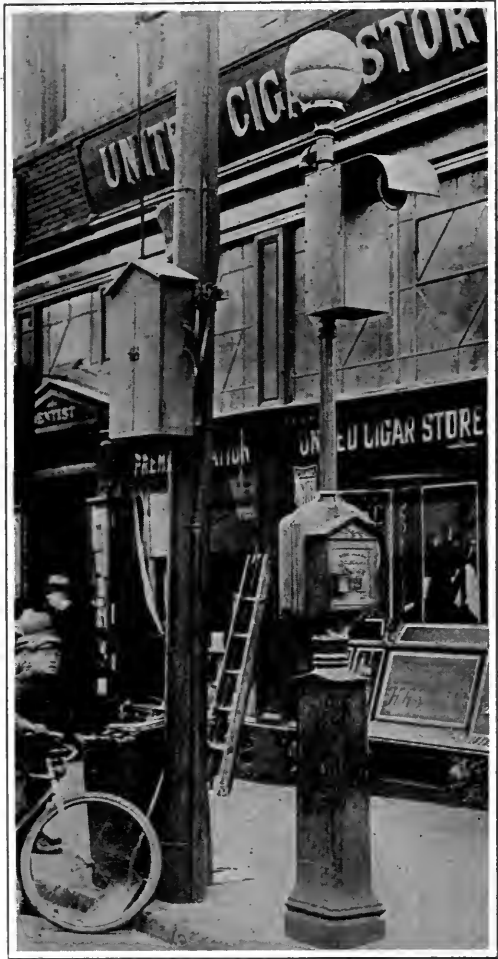
Director, Department of Physical Education of
the Public Schools.

Fire Departments

A Satisfactory Fire Signal

BRIDGEPORT, CONN.—The city of Bridgeport has installed and uses for fire signals eleven Klaxon horns in different sections of the city. They have been in use for six or eight years, giving excellent service and demonstrating their effectiveness in clearing the streets. They are operated from fire alarm headquarters; those in the center of the city through a uniform time relay, which is cut in at headquarters on a closed tapper circuit and is operated by a 20-volt storage battery through a switchboard. There is a duplicate set of batteries in reserve. In testing, the record is made on the outgoing register, in the same manner as for the alarms going to the engine houses, which furnishes a check on the condition of the circuit.

The open-circuit side has a duplicate set of twelve storage batteries that run to each of the seven horns operated from headquarters to a 4-ohm open-circuit relay, located in the horn box on the pedestal. There are ten weather-proof Columbia dry cells in each horn box to operate the horn. Using a relay and batteries at the location of a horn enables one to make all necessary tests in cleaning and adjusting a horn with-



IN CASE OF FIRE, THESE HORNS EFFECTIVELY CLEAR THE STREETS

out disturbing any other horn.

There is a push button key on the telephone desk at fire headquarters, and when the apparatus responds to a still alarm, a signal of 2-2 is keyed out by the operator without leaving his chair. The accompanying picture shows the pedestal with horn, fire and police box, and signal light, which is flashed by a motor-driven transmitter at police headquarters. There are forty-eight of these lights. The globes have the words "Fire Alarm" or "Police" on them, as the case may be. When not being flashed, a steady light is shown.

This fire alarm device was worked out in the Bridgeport Fire Department, and has proved exceedingly satisfactory.

ARTHUR E. PLATT,
Superintendent, Fire Alarm Telegraph and Police
Signal System.

Forward Steps Gathered Here & There

Children as Home Fire Inspectors

COLUMBUS, OHIO.—The American home is a sacred precinct, not open to invasion, and yet it is a prolific source of fire loss and death. The child is the link that binds the school and the home together, the teacher being practically the mother during school hours. Under the Russell Law, fire prevention must be taught in the Ohio schools, and since this is so, why not use the child as the means of getting the vital doctrine into the home?

From this train of reasoning was born the Home Inspection Blank idea. The city of Columbus tried it out in one of her "Clean up, Spade up, and Keep it up" campaigns. The result was at once astounding and satisfactory. This blank took in not only the fire hazards, but also the hazards to life and limb, and the beautification of the home and its surroundings. Perhaps this was going too far, since a few of the parents objected to questions they considered impertinent, and yet a large percentage of the questions were answered. For instance:

It is difficult to have removed from homes the deadly rubber tube connecting service pipes with different types of natural gas stoves and heaters. Especially is this a delicate task in private home bathrooms and bedrooms. The children found these menaces, and inspectors of this department and the fire department removed them. It is true that some were immediately replaced, since neither this department nor the firemen had a right to destroy them, but in the majority of cases the lesson of the danger had been driven home and—*stuck!*

To make a long story short, each school child, no matter of what grade, was given a blank by his teacher and told to fill it out. The teachers cooperated with this department and the Fire Prevention Committee of the Chamber of Commerce having charge of the local clean-up. Over 5,000 hazards were found. Those pertaining to health were referred to the proper city department. Boy and Girl Scouts also did splendid service. Fire chiefs of other cities used the idea, simplifying or adding to it to meet

local conditions. The next time the blanks were used there was less parental opposition. A copy of the blank follows:

HOME INSPECTION BLANK FOR SCHOOL CHILDREN

Ordered by the Fire Chief

The teacher is requested to give one of these sheets to each of her pupils to take home. The questions should be answered by the pupil with the help of the parents and returned to the teacher on the following day. The teacher should take up the sheets when properly filled out and turn them over to the fire chief; they are not intended for the insurance companies.

QUESTIONS TO BE ANSWERED:

1. Name..... Town.....
Street and No.....
2. Is there any rubbish, such as old papers, broken furniture, etc., in the attic?.....
3. Is there any rubbish or scattered kindling in the basement or cellar?.....
4. Is there any inflammable rubbish in the yard?...
5. Are floors under stoves protected by metal or otherwise?
6. Are walls, ceilings and partitions protected from overheating of stoves, furnaces and pipes?.....
7. How do you dispose of your ashes?.....
8. Do you keep your matches away from heat and out of the reach of children?.....
9. What is the material of the house and the roof?
10. Is the foundation enclosed?.....
11. Are chimneys in good repair?.....
12. When were they last cleaned?.....
13. Do stovepipes pass through attic or closets?.....
14. If there are any unused stovepipe holes, how are they covered?.....
15. Do you ever keep or use gasoline in the house?..
16. Do you use a gasoline or kerosene stove for any purpose?.....
17. How is your house heated?.....
18. Are any gas connections made with rubber tubing?.....
19. Name all the purposes for which kerosene is used in your home.....
20. Do you use a "dustless" oil mop?.....
If so, where do you keep it when not in use....
21. Do you use electric smoothing irons?.....
22. Name any other fire hazard in or about your home
23. Have you any fire extinguishers?.....
24. Where is the fire alarm box nearest your home?.....
25. Do you know how to turn in an alarm?.....

In Columbus, the way to the home through the school child had been admirably paved by Lieutenant Glenn A. Beall of the local Fire Department.

In addition to the inspection blanks, it is now proposed to present an attractive badge, engraved "School Fire Chief," to the best posted scholar in the several schools. After a reasonable time these badges will be open to competitive examination.

WILL C. PARSONS,
Division of Fire Prevention and Publicity, Ohio
State Fire Marshal's Department.

Organization of the Sewerage and Water Board of New Orleans

Long-Term Appointive Board Proves Effective in the Administration of Water-Supply and Drainage Systems

THE drainage and water-supply problems to be overcome in New Orleans have been difficult and unusual and have presented many opportunities, if not necessities, for unusual treatment. The fact that their treatment has been in the hands of men who have developed with and by their work and who have in mind all of the local experience and difficulties of the past to guide them in the maintenance, operation and extension of the work in the future, has been a most important factor in the success and economy of the results thus obtained. The Sewerage and Water Board of New Orleans, a long-term appointive board in charge of this work, is composed of 13 members, as follows:

1. Seven members, one from each of the seven municipal districts into which the city is divided, who must be a resident and property taxpayer of said district. These members are appointed by the Mayor, with the approval of the City Council, for 14-year terms, so that, except for deaths, resignations or removal from the districts which they represent, a vacancy occurs only once every two years. In case of a vacancy for an unexpired term, said vacancy is filled for the period of the unexpired term, so that the regular term dates are not disarranged. Reappointment is rather the rule in case of expiration of terms.

2. Two members of the Board are ex-officio members because of their membership on the Board of Liquidation of the City Debt, a life board, which elects to fill its own vacancies, namely, the President of the Board of Liquidation and one other member.

3. Three designated members of the City Commission and the Mayor of the city are ex-officio members of the Sewerage and Water Board, and the Mayor is ex-officio President of the Board.

The members of the Board receive no salaries or compensation in any way from the Board, nor do the members of the Board of Liquidation. The Mayor and members of the Commission Council of course receive regular salaries.

The Sewerage and Water Board was organized in 1899. At that time the City Drainage Commission, which was somewhat similarly constituted, had existed since 1897, and in 1903 there was a final merging

of the two boards into the Sewerage and Water Board, constituted as above described, and the drainage work was also placed under the jurisdiction of the Sewerage and Water Board.

The result of the above procedure has been that the original employees of the Drainage Commission and the first employees of the Sewerage and Water Board taken on from 1900 to 1903 constituted the nucleus of the force used to develop all three systems. Nearly all the men occupying the most responsible positions in connection with all three systems have come up by promotion from these original forces. No one has ever lost his position or failed of promotion because of any political consideration.

At present the demand for service is overtaking the capacity of the present system, and the funds available for further improvements are too limited, with present material and labor cost, to permit the Board to maintain such margins of safety as should really exist in the services over which it has jurisdiction. This necessitates conditions for both operation and improvement which demand the most intimate knowledge of the systems by the forces in charge, in order to have the greatest possible amount of service for every expenditure and still keep everything moving toward proper and logical ultimate developments.

A Wise Policy

The original general main drainage plans prepared in 1895, and the sewerage and water plans developed from 1900 to 1903 and built mainly from 1903 to 1909, have all three proved themselves admirably adapted to meet the local difficulties, and the gradual construction and extension of all three systems have conformed closely to these general plans, which in no case attempted to dictate so minutely the procedure of the future as to preclude such improvements as experience and changing conditions might require.

There has, therefore, never been anything like a change of policy or administration on

the part of the Sewerage and Water Board, but the whole development from the first inception of the drainage system, the construction of which was started in 1897, has been carried on harmoniously with a gradually expanding force to meet the expanding fields of work—first design, then construction, then maintenance and operation, with extensions and improvements, all with the unanimous belief that every dollar of expenditure was of service for the greatest number of people.

The expenditure for the construction of the three systems out of the Sewerage and Water Board construction fund have aggregated about \$30,000,000 to date; the cost of maintaining and operating the three systems was \$1,089,000 for 1919, having gradually increased to that amount from \$743,000 in 1915 on account of the increased material

and labor costs, and increased amounts of service required of all three systems. In all of these expenditures there has never once been even a suspicion of any graft or any impropriety on the part of any member or any employe of the Board.

All of the above would seem to indicate the wisdom of having commissioners appointed for longer terms than that of the city administration. It was the obvious and expressed intention of the law creating the Sewerage and Water Board, that its salaried employes should hold their positions indefinitely, so long as there was need for their services and they were competently performing such service, and that vacancies should be filled as far as possible by promotion. There has as yet been no tendency to follow any other course.

Art Suggestions for American Homes and Communities

Realizing the vital importance of home surroundings as a background for developing American life, The American Federation of Arts, a national organization of 252 chapters and thousands of individual members throughout the country, has in circulation two interior decoration exhibitions giving color and arrangement schemes for home furnishings; several exhibitions of printed and woven fabrics which may be used in the various rooms from the living room to the nursery; several exhibitions of prints, most of them in color, and photographs suitable for home decoration. Other pertinent collections to follow will include pottery, furniture, silver, lighting fixtures, etc. Recently the Federation has inaugurated a service which consists of sending to individuals portfolios of prints and photographs so that home-makers may at their leisure select one or more which particularly appeal.

Not only to the home of moderate means does the Federation confine its suggestions. It keeps continuously on tour many groups of original oil paintings, water colors, etchings, tapestries, pieces of sculpture, most of which may be purchased. Then there are the collections of domestic architecture and landscape architecture, which round out

this comprehensive group of some fifty traveling exhibitions.

All the collections sent out by The American Federation of Arts are assembled by experts, and while, of course, they are not submitted arbitrarily by the Federation jury, they contain some of the finest examples of artistic production in the various lines represented. A community showing an exhibition sent out by this organization benefits by it, and nine times out of ten makes the showing of Federation exhibitions a habit. Membership is not a condition of obtaining the exhibitions, and they may not be shown for pecuniary profit.

A most interesting sidelight on this effort of The American Federation of Arts is the interest shown by public-spirited citizens and groups from the standpoint of community or town growth. The presence of such exhibitions in a town or village, or in a club or institution in a larger city, gives a certain *cachet* to the community or region, a sign indicating progress, a proof that that group at least is looking toward cultural advance.

Further information may be obtained from Richard F. Bach, Extension Secretary, The American Federation of Arts, Metropolitan Museum of Art, New York, N. Y.

Playgrounds and More Playgrounds— How to Get Them

By Harrison Gray Otis

EDITORIAL NOTE.—An increased and widespread interest in outdoor recreation is one of the war's heritages. Cities everywhere are enlarging their playground systems, and are employing more trained recreation leaders. The Playground and Recreation Association of America, 1 Madison Avenue, New York City, has for fourteen years been promoting the play movement, and presents herewith a resumé of the methods that cities are employing to secure and extend public playgrounds and recreation systems. Getting playgrounds is only one step in the program. There still remain the problems of construction, equipment, management, operation, activities, and methods of securing trained play leadership. THE AMERICAN CITY will welcome inquiries from readers on any matters having to do with community recreation.

MR. and Mrs. Public have about decided that playgrounds are good things. We say "about," because there are still hundreds of towns and cities that seem quite sure their alleys and gutters will do for Johnnie, and that Nellie should "stay in her own back yard," anyw a y. However, the rapid spread of the playground movement during the past few years gives hope that Progress is winding up the Big Bens of public opinion and placing them under the pillows of these slumberers. An early awakening seems certain.

There is a difference between deciding that a thing is good, and investing in it. Enter, the familiar problem of ways and means.

How can we get playgrounds, more playgrounds? is the question before the house.

The fact that other cities whose financial conditions are probably no more flourishing

than our own are investing thousands, even millions, in playgrounds and parks, shows that the problem can be solved. The methods by which some of these towns have secured the neces-

sary funds may point out the factors which will solve the equation in our town.

The year's statistics for 1920 showing the progress of public recreation in American cities present some interesting figures.

The 465 cities reporting, maintained 4,293 playgrounds and recreation centers under paid leadership. They employed 10,218 workers—an increase of 2,175 over the number reported for 1919. There was an increase of 42 per cent in the number of play-

grounds and recreation centers established during the year. More than \$7,200,000 was spent for recreation work.

The complete report on bonds issued is



Courtesy Park International

WE WANT A PLAYGROUND

not yet on hand, but during 1919, 17 cities voted a total of \$13,510,000 for establishing and increasing playground systems. One of the largest bond issues recorded in 1920 is that voted last November by Akron, Ohio, a city of 208,000 population, amounting to \$2,000,000 for a system of parks and playgrounds. The largest single investment in recreation authorized during 1919 was the \$10,000,000 bond issue voted by Detroit for increasing its public outdoor play facilities.

These figures are little less than astounding when we realize that the whole movement for organized playgrounds in America is a development of this generation. When Chicago appropriated its first \$1,200 for playgrounds, there was widespread opposition and ridicule aroused by such a "frivolous expenditure of public money." This was less than twenty years ago. To-day Chicago has millions invested in its wonderful playground system. Is it paying? A study of juvenile delinquency, by Allen T. Burns, shows that the presence of recreation centers in Chicago's south side was coincident with a decrease of delinquency within a radius of half a mile, amounting to practically 30 per cent. Chicago's voters prefer to invest in playgrounds rather than in reformatories and jails.

A clear presentation of such facts means more playgrounds. There are arguments a-plenty to appeal to the heart and the pocketbook of the shrewdest business man. The art of driving them home is salesmanship, and when the idea is thoroughly sold by modern publicity methods, the chief problem is solved, for if a community really wants playgrounds it can always find some way to raise the funds.

Public Pay for Public Play

There is a growing tendency to regard recreation as a municipal function, and there are, of course, self-apparent reasons why the public should support these recreation centers which benefit the citizenship as a whole and are open equally to all. Figures are not available as to just what proportion of funds for securing playgrounds comes from the public treasury, and what part is subscribed by private individuals.

It is, however, significant that in 361 of the 465 cities reporting, public recreation

work was supported in whole or in part by some department of the municipality—over 79 per cent of the total number, and an increase of 20 per cent over the corresponding figures for 1919.

Whenever the field secretaries of the Playground and Recreation Association of America are called upon to assist a community in developing a year-round recreation system, which usually involves more playgrounds, the advisability of securing municipal appropriations is strongly urged. The method of procedure employed by these trained promoters of community recreation varies, of course, with local conditions. The request for their services usually comes from some responsible organization, such as the Chamber of Commerce or Rotary Club, from a group of leading citizens, or from the city government itself. A strong representative committee is formed, and a careful study of the local problems made. A year's program is then developed, including the construction of a playground system or the expansion of the playground system in many cases, and a detailed budget is prepared. Simultaneously, an educational campaign is carried on, utilizing the usual channels of interviews, speeches, newspapers, and sometimes demonstration playgrounds, parades and pageants.

The budget and a draft of the necessary legislation, with supporting data, endorsements, petitions and information as to what other cities are doing, is duly laid before the city authorities at the right time, by the right people, in the right way. Usually the initial municipal appropriation is not so large as will be needed as the work develops.

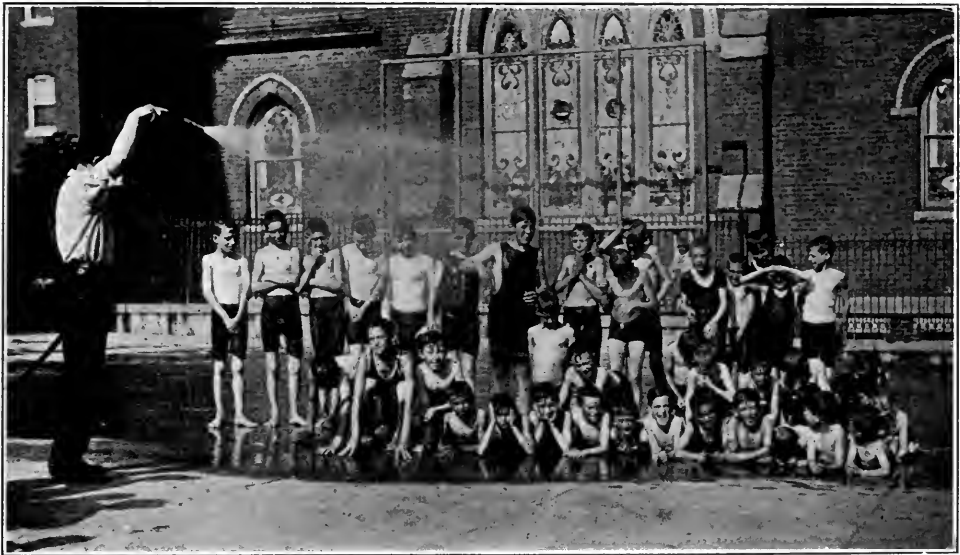
Frequently the community finds that its immediate playground needs exceed the limitations of the available city funds and require a special bond issue, which usually means an election. Again, it develops that the legal taxing and bonding limits have already been reached and do not permit of further expansion. Increased taxation, moreover, is sometimes a bugaboo difficult to overcome, for it is a strange fact that some men who are generous contributors to a worth-while movement will oppose the same movement if it means a higher tax rate. Consequently, many cities have decided, perhaps wisely, not to wait for sufficient public funds before starting their playground systems.

"Coupon Bonds" for Playground

Charlotte, N. C., has a population of some 50,000. Playgrounds were needed. A group of citizens decided to endeavor to raise money by popular subscription, and placed the necessary amount at \$15,000. Feeling the need of the added stimulus to be gained by calling in a trained community organizer, arrangements were duly made, and a general committee of those interested met with the Mayor on Saturday, May 15, 1920. At this conference so much opposition was aroused that the Mayor was requested to telegraph the organizer not to come, but fortunately could not locate his address. On Monday a second conference of the

to sell as many of the \$5 membership coupons as he wished. It was explained to the committee that if they issued 150 of the \$100 certificates and sold them they would have their \$15,000 and, incidentally, an advisory board composed of those who were actually interested in the movement. In turn, if these 150 holders each sold all of his \$5 memberships, there would be a total sustaining membership in the Playground Association of 3,000.

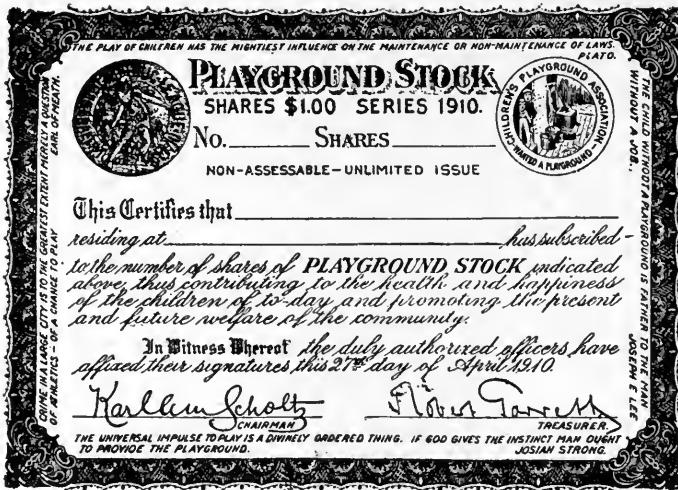
The committee decided it was worth trying, and arranged for speaking dates and luncheon engagements with the following organizations: the Rotary Club, the Kiwanis Club, the Good Fellows Club, the Parent-



ENJOYING A HOSE BATH AT A PATERSON, N. J., PLAYGROUND

same group was called, with the organizer present. It developed that the city was just passing through a tremendous financial campaign to secure \$40,000 for another movement, and that the total amount raised was only \$22,000. The community and its leaders were worn out and discouraged. The organizer, realizing that it would be impossible to conduct another drive of a similar nature, sketched a rough draft of a certificate calling for the underwriting of \$100. Attached to this certificate were nineteen \$5 membership coupons. A person subscribing to a \$100 certificate would automatically become a member of the general advisory board of the Charlotte Playground Association. He was, of course, privileged

Teachers Association, the Woman's Club, the Teachers Association, the United Daughters of the Confederacy, the Daughters of the American Revolution, and a number of others. Before each group the playground movement was advocated, and it was carefully explained that the financial methods proposed would not involve soliciting money by the usual drive methods. A general luncheon to be held at a leading hotel Wednesday noon, May 26, was announced, and cards pledging the signers to attend this luncheon were distributed at these meetings. Two committees were appointed; one called the "Initial Gifts Committee," composed of leading business men, was detailed to do a bit of advance work so



**PLAYGROUND "STOCK CERTIFICATE" ISSUED
IN BALTIMORE, MD.**

as to start the subscriptions off in good shape. The "Follow-Up Committee" was appointed to take the names of those who had agreed to attend the luncheon, to see that they did not forget the appointment, and to secure the attendance of other representative citizens.

At the luncheon 145 people were present. The "eats" were followed by some rousing community singing, and the campaign plan was sprung. Within an hour the entire issue had been sold and over-subscribed, and there was every indication that the \$16,100 pledged would be increased to \$20,000 with little effort.

A similar method was employed in Wilmington, Del., in September, 1920. An executive committee of the City Park Commission and of the Wilmington Community Service had charge of the campaign. September 26 was "Community Sunday," and the pastors referred in their sermons to playground and recreational work. Officials of the Central Labor Union offered campaign help, and General T. Coleman DuPont added impetus to the drive by offering to give 5 per cent of the entire sum raised during the campaign. The "surprise feature" of the campaign was made known at the campaign luncheon at the Hotel DuPont on September 28, when the sale of \$100 "coupon bonds" began. "Buy a playground bond" became the slogan. The young women of the Red Cross Motor Corps went about the room collecting pledges. An ag-

gregate of \$22,600 was subscribed.

The following organizations bought bonds at the luncheon, to the stated amounts; the inmates at the New Castle County Workhouse (where community sings had been held), \$100; Volunteers of America, \$500; Knights of Columbus, \$700; Washington Heights Century Club, \$200; Junior League, \$300; Greek citizens, \$1,000; Stores Committee, \$300; DuPont employee, \$1,200; Theater Committee, \$100; St. Andrew's and Grace Churches, \$100 each;

Daughters of Isabella, \$300; Central Labor Union, \$1,000; Kiwanis Club, \$500; Red Cross Motor Corps, \$1,500; Hercules Powder Company, \$400; Speakman Company, \$200. Large contributions were also made by private citizens.

Somewhat kindred to the "coupon bond" method is the "stock selling" plan. Baltimore was perhaps one of the first to sell playground "stock," in its playground campaign of 1910. One-dollar shares were sold at par in whatever quantities the purchaser could be persuaded to invest. This method lacks the "hurry-up" feature of the \$100 coupon bond, but by reducing the unit from \$5 to \$1 the number of "investors" is increased. The stock certificate, attractively engraved and containing apt quotations, has proved a popular selling document.

Community Chest at Cleveland

There is hardly a community in the country that has not had experience in conducting popular drives during the past few years, though perhaps "popular" is no longer a good word to use in this connection. There are cities, however, that are raising their funds for playgrounds by the same sort of campaign methods employed during the war. Other cities have adopted the "community chest" idea, with their playground projects included in the general budget. Cleveland, Ohio, has had a particularly successful experience in conducting community chest campaigns. The budget

for 1921, which has recently been raised, provides \$41,960 for Cleveland's recreation council. Some of the publicity methods used by Cleveland may well be adapted to playground campaigns. The accompanying diagram, which appeared on the back cover of the campaign book, tells its own story.

During this campaign an eight-page photogravure newspaper supplement told the story in pictures in a most forceful and impressive manner.

At Winnetka, Ill., a residential suburb of Chicago, effective use was made of letters sent to practically every citizen. The letter-head contained the names of the "Committee of One Hundred" and set forth the proposition briefly, clearly, and with a telling touch of human interest. Attached to the letter was a table of parallel arguments issued by the Playground and Recreation Association of America.

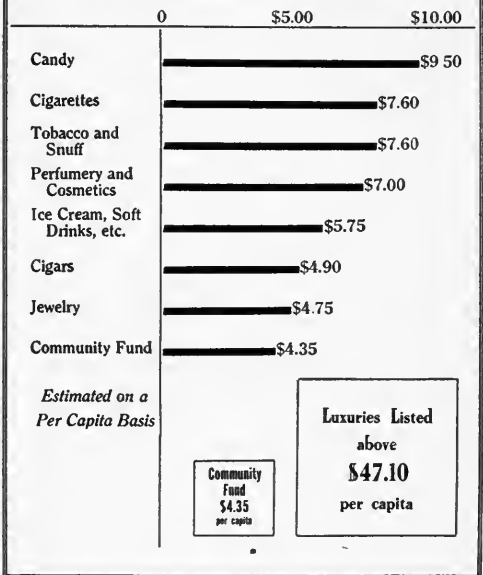
Oftentimes the playground movement has had for its sponsor some one or more community organizations. At Hagerstown, Md., the Rotary Club was so thoroughly "sold" that it became godfather to the movement and pledged sufficient funds to start things going. In Newark, Ohio, the public schools organized and put through a successful campaign. Six hundred high school students were divided into thirty teams of twenty pupils each who did the actual soliciting.

A Neighborhood-Made Playground

A great deal can be accomplished without much money if there is determination

Average Amounts Spent in 1919 for Various Items by Residents of Cleveland and Suburbs

(Figures for Commodities are average for entire United States as shown in statement by U. S. Treasury)



PLAYGROUND CAMPAIGN PUBLICITY IN CLEVELAND

and coöperation. In the stock-yard district of San Francisco, known as Bay View, the community got together last spring and turned a stump-filled, tin-can-covered field

PLAYGROUNDS DEVELOP:

1. *Health*, by spontaneous outdoor exercise
2. *Initiative*, by forcing the child to make his own decisions
3. *Purity of mind*, by keeping the child active in wholesome surroundings
4. *Coöperation*, by teaching the child to give and take assistance, thus showing him the value of concerted action
5. *Ambition*, by teaching the child that leadership is the result of successful endeavor
6. *Honesty*, by causing the child to repudiate any success that does not come through fair play
7. *Imagination*, by lifting the child out of the commonplace and filling him with enthusiasm
8. *Self-confidence*, by giving the child some responsibility in the games
9. *Obedience*, by teaching the child to respect the leader
10. *Justice*, by teaching the child to have consideration for those who are physically and mentally weaker

PLAYGROUNDS DIMINISH:

1. *Idleness*, by keeping the child constantly employed
2. *Delinquency*, by influences that tend to develop the better self
3. *Exclusiveness*, by giving each some part in the games
4. *Unfairness*, by teaching true sportsmanship
5. *Gang-spirit*, by diverting the spirit of leadership into the right direction
6. *Selfishness*, by encouraging the child to help others
7. *Rowdyism*, by furnishing the influences that foster courtesy and self-respect
8. *Temptation*, by keeping children off the streets
9. *Social barriers*, by bringing children of all classes together
10. *Reformatories*, by giving the child active work to do, thus forming instead of reforming character

into a community playground. Five hundred men, women and children spent a single day on the job, and the result was a surprise to everyone. A baseball diamond was laid out, a basketball court staked off, and a kiddies' corner located. The equipment was furnished by local fraternal organizations: the Ancient Order of Hibernians gave the backstop for the ball field; the Knights of Pythias equipped the basketball court; the Carnation Club supplied the kiddies' field with sand-boxes, swings and slides. The entire play field, complete in every detail, was constructed and equipped by volunteer effort.

A time-honored way of raising money was employed at Key West, Fla., with rather unusual success. On April 6, 1920, the Red Cross held a cabaret and dinner dance for the purpose of securing funds for the playground. The affair consisted of a fashion review, instrumental and vocal music, and esthetic and social dancing. About 400 people attended, and the gross receipts totaled \$1,000. The amount cleared was enough to begin the playground work contemplated. On April 8 and 9 a one-act play, entitled "America First," was given at two of the public schools. The admission charge of 15 and 25 cents yielded \$250 for playground equipment. This method of securing funds has the advantage of being a worth-while sort of community recreation in itself. There were 88 people in the cast, and music was furnished by two volunteer community orchestras.

Individual Donations and Memorials

Many communities have started or increased their playground systems through the generosity of well-to-do citizens who have donated funds, land, and in some instances fully equipped playgrounds, to the city.

There are many illustrations of this form of public service. Two of the best-known in the country are those at La Jolla, a neighborhood of San Diego, Calif., and Peoria, Ill., where complete recreation centers, including admirable community buildings, have been constructed through the generosity of private citizens.

By far the larger number of playgrounds have been secured through bond issues and

municipal appropriations, yet in nearly every case the initiative has fallen upon community leaders who have created the public sentiment necessary before public funds are forthcoming. Cooperation and publicity are the fundamental requisites. A handbook on publicity methods has just been published by the Playground and Recreation Association of America.

Many playground systems owe their existence to a combination of public and private funds. In Americus, Ga., last May, the city bought a playground site for \$11,000, and the Americus Community Service committee undertook to raise a like amount for equipment and operation. At Bay City, Mich., playground funds are provided in part by the school board and in part by the Bay County Community Board.

Intelligent Leadership Essential

The one thing needed most in this, as in all civic projects, is enlightened community leadership. The modern chamber of commerce democratically organized is admirably adapted to the task of starting the ball rolling.

Before a community sets out to get playgrounds it must know what it wants. A definite proposition is much easier to sell than a vague principle. Some sort of intelligent study of the local situation, tempered by the knowledge of what other cities are doing, and of the essential features of modern playgrounds, is a prerequisite. It is often a wise economy to invite the co-operation of some acknowledged playground authority before definite plans are adopted.

Another prerequisite is a clear understanding of the laws relating to playgrounds. Several states have already passed enabling acts providing for their construction and maintenance. Among the best of these acts are the ones passed in Michigan, in New York and in Pennsylvania.

State after state is enacting laws making compulsory the proper physical education of school children. A well-equipped playground is almost essential to the carrying out of such legislation. The time is not far distant when every city and town of the country will come to realize the importance of organized play in the great out-of-doors as a mighty factor in building good citizenship.

Standard Schedule for Grading Cities and Towns for Fire Insurance

Part III

With Reference to Their Fire Defences and Physical Conditions

By John S. Caldwell

Engineer, New England Insurance Exchange, Boston, Mass.

EDITORIAL NOTE.—The earlier instalments of this article cover the requirements for a satisfactory water-supply and fire department and the deficiencies applied to the Standard Schedule for insufficient equipment or personnel.

THE response to alarms should include that an adequate running card will be established, providing for first and subsequent alarms, and for outlying companies to occupy vacated stations. Apparatus should respond to all first (including telephone) alarms in amount commensurate with the normal hazard of the district, but not less than as follows:

In mercantile and manufacturing districts:

Not less than 2 engine or hose companies and 1 ladder company in cities under 25,000 and over 4,000 population

Not less than 3 engine or hose companies and 1 ladder company in cities over 25,000 and under 50,000

Not less than 4 engine or hose companies and 2 ladder companies in cities over 50,000

In residential districts:

Not less than 2 engine or hose companies, except for cities under 4,000 population

Modern fire methods should include the liberal use of chemicals, shut-off nozzles, and salvage appliances to reduce water damage, the use of appliances for powerful streams on serious fires, suitable ladder work and ventilation, and the general policy of attaching lines to siamese connections serving sprinklers and stand-pipes.

Lack of proper equipment should be considered in determining deficiency in fire methods.

In considering conditions affecting fire department operations, the street surfacing, existence of railroad crossings, drawbridges, grades, traffic regulations and ordinances are considered, together with presence of high-tension and overhead wires, which introduces a more or less obstruction to the use of ladders and in general retards the work of the department.

Systematic and frequent inspections of

buildings should be made by company and department officers to acquaint them with local conditions, and records of such inspections should be kept both by notes and sketches.

Proper records of all fires, fire methods, losses, apparatus, and all department matters should be kept in convenient form.

Fire Alarm

The subjects considered under the fire alarm system are as follows:

1. Qualifications of Management
2. Adequacy of Maintenance Force
3. Operators
4. Headquarters Building
5. Apparatus at Headquarters
6. Circuit Protection
7. Batteries
8. Circuits Underground
9. Condition and Material of Circuits
10. Circuits near High Potential
11. Open or Grounded Circuits
12. Overloaded Circuits
13. Alarms to Fire Stations
14. Condition of Inside Wiring
15. Type of Boxes
16. Conspicuousness and Accessibility of Boxes
17. Condition of Boxes
18. Distribution of Boxes
19. Tests and Records
20. Speed of Alarms
21. Fire Department Telephone System
22. Transmission of Telephone Alarms
23. Provisions for Transmitting Telephone Alarms from the Telephone Exchange
24. Method of Handling Telephone Alarms at the Telephone Exchange

In considering the item of Qualification of Management, it is assumed that the executive in charge is competent and experienced in the details of fire alarm construction and maintenance to efficiently fill the office.

The maintenance force should be adequate so as to minimize the time that the system would be out of commission in case of breakdown, as well as to efficiently operate and maintain it, or good, reliable provisions should be made for obtaining emergency competent help.

The operating force should consist of some competent man controlled by the municipality, but not necessarily at fire alarm headquarters, on duty at all times to handle telephone alarms, provided, however, that in municipalities of less than 10,000 population one-half credit, and in larger cities one-quarter credit, may be given for a telephone operator on duty at each public exchange at all times with facilities for transmitting alarms giving the definite location of the fire.

In cities handling an average of over one alarm a day, a fire alarm operator should be on duty at fire alarm headquarters, and when manual operation is depended upon for transmission of alarms, two operators should be on duty at all times. An operator of the department telephone system if capable of operating the fire alarm system may be considered as one fire alarm operator.

The building housing the apparatus on which operation of the system and the receipt and transmission of alarms are dependent should be housed securely against fire, including danger from conflagration. When service is dependent entirely upon the telephone exchange, application shall be made to the exchange building.

The apparatus at headquarters should be such as will ensure the receipt, recording and transmission of all alarms, and should be maintained in proper working condition. Cities having over 100,000 population or more than 350 alarms a year should have provision permitting transmission manually; if automatic transmission is also provided, means should be provided for cutting out the automatic feature. Relative values of headquarters equipment are as follows:

Manual System:	Per Cent
Receiving apparatus	25
Transmitting apparatus	25
Recording apparatus	20
Switchboard	15
Testing facilities	15
Automatic System:	
Repeater	50
Break-wheel transmitter	20
Switchboard	15
Register	10
Cable terminal	5

In automatic systems registering device and means of manual transmission need not be at fire alarm headquarters, but must be where telephone alarms are received.

The protection to circuits should consist of heavy-current and sneak-current fuses and lightning arresters at headquarters, so

located as to prevent injury to any operating mechanism, lightning arresters and heavy-current fuses at junction of overhead and underground construction and heavy-current fuses on battery rack.

Energy for operating the system should be supplied by storage batteries in duplicate sets, or generator sets with sufficient reserve, properly mounted in a well-heated and ventilated room separated from other apparatus. In single-circuit systems primary batteries may be used. Provisions should be made for obtaining a duplicate source of supply within five hours. Charging should be normally from an all-metallic circuit and should preferably be current of not over 250 volts.

The location of outside circuits should be underground. In underground construction and aerial cables, they should be at least No. 14 gauge copper with rubber insulation in lead sheathing and with each leg of a circuit in a different cable. All aerial circuits should have conductivity of No. 10 galvanized iron and tensile strength of No. 10 copper wire, with double or triple braided weatherproof insulation. Pole construction should be substantial, and wires including box leads should be well strung and free from injury. The running of circuits into buildings other than fire stations introduces a hazard.

No circuit should be in the same duct or manhole nor on the same pole with high-potential circuits. All box and alarm circuits must be normally closed, all metallic and under constant test. There should not be more than twenty boxes dependent upon any box circuit, and box circuits should have only boxes attached, except that in automatic systems registering instruments and tappers in fire stations may be connected. No alarm circuit should connect instruments in more than five fire stations.

Except where only a single circuit system is required, each fire station should receive alarms over two alarm circuits; in an automatic system each box circuit should extend to some fire station and may count as one of the alarm circuits. Station apparatus should include a gong, a tapper and a permanent registering device, the register and tapper to be on the box circuit in automatic systems.

Circuits at headquarters and in fire stations should be in accordance with the National Electrical Code, wooden moulding be-

ing strictly prohibited, and all circuits should enter stations in conduit.

Boxes including both public and private should be of the positive non-interfering type, and when more than twenty boxes are on the system they should have the successive feature; all boxes to be accessible to the public and conspicuous as applying to location and designation, and including red lights at night on or close to boxes in high-value districts; they should also be provided with key in lock, glass panel door, or keyless self-acting door.

Boxes should be maintained in good operative condition, tested monthly and after electrical storms, test to include visual inspection, operation, cleaning and repairing; condition of boxes is used in judging of thoroughness of tests.

Proper distribution of boxes requires a public box or a private box accessible to the public within at least 500 feet of every building in mercantile and manufacturing districts, and 800 feet of every important group of buildings elsewhere.

Tests and records should include that circuits at headquarters will be tested three times daily in automatic, and twelve times daily in manual systems, also frequently in wind and electrical storms, including tests for grounds, breaks and current strength; in manual systems insulation resistance to be tested weekly; battery cells to be tested for voltage and electrolyte weekly; office circuits three to twelve times daily, circuits examined monthly and after wind and sleet storms; complete records to be kept of all tests of apparatus and layout of system and of all troubles; condition of system to be used in judging of thoroughness of tests.

Speed of boxes and of alarm transmission should not be less than one stroke per second in automatic and two strokes per second in manual systems; tower bells, if necessary, to be operated on a separate circuit so as not to delay the operation of the system.

There should be a telephone at each fire station connected by a single-party line preferably from some central point where a municipally controlled operator is on duty at all times; for cities having more than five fire stations these should extend from a private switchboard. Provisions should be made permitting stations to be communicated with simultaneously or in groups.

Telephone alarms should be transmitted from the public exchange to the same place

in all cases and not to any fire company called, nor to all fire stations simultaneously; they should be transmitted to all fire stations as box alarms, after notifying the nearest company by telephone.

The sounding of ward or box numbers on tower bells or equivalent mechanism is sufficient in towns up to 5,000 population having call or volunteer fire departments.

At least one circuit from the public telephone exchange should be reserved for fire calls with the switchboard jack conspicuously marked, and the supervising operator or other responsible employe should verify the location and oversee the transmission of fire alarms.

Police

The subjects considered under Police are as follows:

1. Coöperation with Fire Department
2. Patrol Wagons
3. Signaling System
4. Coöperation with Building Department

From the standpoint of fire protection, the duties of the police are the discovery of fires and the sending of alarms, the preserving of order at fires, and the reporting of buildings under construction without permit. Adequate service requires a proper signalling and telephone system. Municipalities of over 2,000 population should have an adequate number of patrolmen on duty day and night, and if over 15,000 population, should have sufficient wagons and ropes and a signalling system.

Building Laws

The subjects considered under Building Laws are as follows:

1. Fire Limits
2. Laws
 - a. Areas and Heights
 - b. Protection to Horizontal and Vertical Openings
 - c. Frame Construction in Fire Limits
 - d. Wall Thickness
 - e. Chimneys and Heating Apparatus
 - f. Improved Construction
 - g. Private Fire Protection
 - h. Provision for Fire Stops, Parapets and Fire Escapes
 - i. Provision for Quality of Material and Work
3. Wooden Shingle Roofs
4. Records

It is well recognized among builders and architects, as well as the insurance interests, that one of the large contributing factors to the enormous fire waste in this country is the tinder-box construction of the average American city and town, and while it seems like "locking the barn door after the horse is stolen," the only way to offset

this evil is by the adoption of adequate building laws, either state or municipal. There should be prescribed fire limits, including all closely built mercantile and manufacturing districts and surrounding blocks on all sides which constitute an exposure to the district or within which new construction of a mercantile or manufacturing character is developing; within these limits frame construction should be prohibited. Proper restrictions should be made for heights and areas, requirements for protection to vertical and horizontal openings of all kinds, thickness of walls, private fire protection, chimneys and heating devices, etc., as given in the National Board Building Code. Wooden shingle roofs should be prohibited throughout the limits covered by the water distribution system. A properly qualified official should be in charge, with a requisite number of assistants. Proper records of building permits and operations and inspections to be kept. Lack of enforcement to be considered as equivalent to no laws.

Hazards

The subjects considered under Hazards are as follows:

1. Electricity
 - a. Laws
 - b. Condition of New Inside Work
 - c. Condition of Old Inside Work
2. Gas Lighting and Heating
 - a. Laws
 - b. Conditions
3. Oil Lighting and Heating
 - a. Laws
 - b. Conditions
4. Explosives and Inflammables
 - a. Inflammable Liquids of Class 1
 - b. Inflammable Liquids of Class 2
 - c. Inflammable Liquids of Class 3
 - d. Hazardous Chemicals
 - e. Carbide
 - f. Garages
 - g. Dry-Cleaning
 - h. Nitro Cellulose and Films
 - i. Motion Picture Machines and Booths
 - j. Explosives
 - k. Fireworks
 - l. Matches
 - m. Combustible Fibres, etc.
 - n. Lumber and Packing Material
 - o. Rubbish, Trash, Ashes, Bonfires, etc.
 - p. Definite Requirement for Inspection of Premises
5. Records

Closely allied with the need of building regulations in our American municipalities is the need of regulation of hazardous conditions in all classes of property, as well as the public highways, and it has been demonstrated that the passage of laws, either state or municipal, on the subject of electricity, explosives and inflammables and proper enforcement of such laws, produces immediate results.

The National Electrical Code is the generally recognized standard for electric wiring; its adoption by ordinance is of first importance. The laws should also provide that current shall not be furnished until the installations have been inspected and approved. These results may be obtained through enforcement by a properly qualified official, or under insurance inspection backed by a city ordinance. Where electricity is not generally used, the hazards of glass-body oil lamps, swinging and open gas flames, and of gasoline and acetylene lighting systems are unusually present. The increasing use of oil for heating and industrial purposes introduces a still further hazard which should be regulated by ordinance. In addition, the laws should cover other uses of inflammable liquids and their compounds, explosives and the care of combustible rubbish of all kinds.

Requirements should conform to the suggested ordinances and regulations issued by the National Board of Fire Underwriters. Enforcement should be strict, and frequent inspections should be made; the most approved method of inspection is through the members of the fire department. Lack of enforcement to be considered as equivalent to no laws.

Structural Conditions

The subjects considered under Structural Conditions are as follows:

1. Area of District
2. Street Widths
3. Accessibility of Block Interior
4. Per Cent of Area in Streets and Open Spaces
5. Per Cent of Block Area Built Upon
6. Heights of Buildings Other Than Fire-proof
7. Large and Excessive Areas Other Than Frame
8. Deficient Party and Fire Walls
9. Unprotected Floor Openings
10. Unprotected Exposed Openings
11. Frame Buildings
12. Permanent Awnings
13. Conflagration Breeding Blocks
14. Exposures of District

This subject is designed to be applied to any mercantile or manufacturing district; in the smaller cities it is to be applied to the principal mercantile district, but in larger cities a separate grading may be desirable for each distinctive high-value district. All items apply only to the district considered.

In bounding a district, streets and alleys, sometimes extended, railroads and natural features will be used where practicable, and every block or part block shall be included in which approximately one-third of the area is of the same general class as the district.

Narrow streets, inaccessibility of buildings, congestion of the district and of the individual blocks, poor general structural conditions and exposures from surrounding sections all increase the probability of sweeping fires.

Buildings of fire-proof construction, sprinklered brick buildings, fire-breaks, fire barriers and separate high-pressure fire systems designed to deliver capacity at 90 pounds hydrant pressure or more, form important mitigating features.

Credits

The subjects considered under Credits are as follows:

- 1. Superior Construction and Protection
 - 2. Fire Engine Capacity where Water-Supply at Direct Hydrant Streams is Adequate
 - 3. High-Pressure Fire System
- (Note.—Items apply only to the high-value district considered.)

Buildings of fire-proof construction and sprinklered buildings tend to offer a barrier against a spreading fire as well as offering the fire department a vantage point in preventing a fire from gaining conflagration proportions, and credits are allowed accordingly.

Where the full fire flow is available as direct streams either from a domestic water system or from a high-pressure system, the maintaining of engines in service, with adequate provisions for their response and operation, is considered an advantage as reducing the probability of a fire gaining headway in the interval of time necessary to control the flow from a broken main, and credit should be allowed accordingly.

A high-pressure system may have a gravity supply, direct pumpage supply, or a combination of the two. It may be a separate system for fire service only or may be the extension of a high-service domestic supply into a low-service area, in which latter case only two-thirds the actual fire flow obtainable should be assumed as available capacity. Fire-boat pipe lines should also be considered. To be standard a high-pressure fire service must comply fully with the various items listed under Water-Supply and be capable of delivering in the weakest part of the system the full fire flow required, including that necessary for a second fire, such supply to be available in an area equal

to that served by the number of hydrants necessary to deliver this required fire flow when discharging 1,000 gallons a minute each. For standard fire service this quantity should be available at a residual pressure of 250 pounds, residual pressures less than this, down to 90 pounds as a minimum, permit classing a system as a High-Pressure Fire System, but of less worth in reducing the deficiencies in Structural Conditions. Hydrants should be of ample dimensions with four independently gated hose outlets and with 8-inch gated connections to the mains, to be so distributed that the entire area of the district is protected and the average area served per hydrant will not exceed 40,000 square feet.

Climatic Conditions

The subjects considered under Climatic Conditions are as follows:

- 1. High Winds
- 2. Excessive Snowfall
- 3. Severe Cold Weather
- 4. Hot, Dry Weather
- 5. Unusual or Exceptional Conditions

In consideration of these subjects ten years' records have been compiled from the United States Weather Bureau Stations relative to winds of 25 miles velocity or over, snowfall in excess of 10 inches per month, number of days having a maximum temperature of 32 degrees or less, months having an average mean maximum temperature of 65 degrees or more, with the number of days having .01 inch or over of precipitation, and unusual conditions not measured by climatic conditions, such as forest fires, tornadoes, hurricanes and cyclone blizzards and severe snow-storms, earthquakes, etc.

Where the fractional classes corresponding to the points of deficiency of the water-supply and fire department differ by three classes or more, there shall be added to the points of deficiency a certain number of points varying with the amount of divergence between the classes of the two features as represented in the following table:

Divergence in Classes	Additional Points of Deficiency,	
	Engine Basis	Hose Stream Basis
3.....	45	
4.....	90	
5.....	150	45
6.....	225	90
7.....	315	150
8.....	420	225
9.....	540	315
10.....	680	420

Combating the Shade Tree Pests

By S. R. Winters

VARYING from the seemingly harmless efforts of the "measuring worm" in denuding trees of their foliage, to the more pronounced activities of the two-lined chestnut borer in sapping the very vitality of oaks by its mine-tunneling operations, insect depredations upon shade trees in American towns and cities inflict an annual loss of \$10,000,000. The toll exacted is both civic and economic in character, and the ravages of a countless variety of pests are of sufficient magnitude to necessitate community as well as individual effort.

The methods prescribed by the Bureau of Entomology, United States Department of Agriculture, for combating these tireless and insidious foes are almost as varied as the kinds of insects enumerated as inimical to shade trees. Spraying devices, used in applying arsenical mixtures, however, constitute an approved mode of warfare, the size of the equipment varying from a hand-operated sprayer for injecting a poisonous solution into newly-opened burrows, to a high-gearred spraying outfit for sending the stream of a death-dealing dose to a height of 35 or 40 feet, seeking the destruction of the gypsy moth. Or, as specified in eradicating the elm leaf beetle as an enemy of all species of elm, both community action and costly spraying apparatus are essential. Satisfactory results are insured only when all the trees

in a particular locality are treated simultaneously. The winter months and early spring, the trees being dormant, are opportune seasons when organized effort is most effective.

The Elm Leaf Beetle

The elm leaf beetle, enemy of every species of elm, but partial to the common English elm, increases when the buds begin to swell in the spring. It hibernates in the adult or beetle condition in any suitable shelter. The elm leaf beetle works untiringly for a partial or a complete defoliation of trees, apparently being *particeps criminis* with the bark-boring insect whose attacks subsequent to defoliation result in certain death to the stately elm. Not infrequently the activities of the elm leaf beetle in robbing trees of their leaves lead to a slow death. Spraying the trees with lead arsenate when the buds of the elms have burst, repeated two weeks later, is the prescribed method of control.



FUMIGATING AND FILLING A CAVITY

When this cavity was opened it was found to be full of borers and fungus cups. A syringe could not reach the borers, so fumigating was used. The tree is now healthy and sturdy

Destroying the pupae at the base of the trees will likewise minimize its numbers. Two generations of the beetle are produced annually, the eggs of the second generation appearing in July.

The Enemies of the Birch

For a quarter of a century or more, private and city parks have been deprived of their birch trees by the inability of the lat-

ter to withstand the attacks of natural enemies. The master offender is the bronze birch borer, whose infestations of the bark and wood are accomplished with the seeming ease with which the mole tunnels through the surface of the earth. The top branches of the birch yield first to the undermining influence, the vitality of the tree gradually deteriorates, and its complete death is accomplished a year or two later. Dying tops, reddish or rusty brown spots on the white bark of the trunk and larger branches, and ridges in the bark, are signs of infestation. The borer, which is particularly destructive to imported birch in parks and lawns of the Northern States, attacks poplar and aspen trees as well. The insect is described by an entomologist as a slender, flattened, footless, creamy white grub, about three-fourths inch long when full-grown, which transforms into a small, slender, olive-bronze, winged beetle nearly one-half inch in length. They spend the winter in a chamber in the wood or outer bark which is a tribute to their excavating powers; emerging from their hibernating quarters the following spring, they are transformed into pupae, and these into adults, which gnaw their way out—oval holes in the bark being unmistakable evidence. Trees which have been subjected to extensive ravages not only cannot be recovered, but are a menace to other trees. The badly damaged specimens should be felled and burned during the winter, or not later than May first.

Birch, poplar and aspen trees not beyond redemption can be rescued by spraying with a kerosene emulsion, which destroys the eggs and young larvae before they gain admittance to the wood. The kerosene emulsion, which is equally effective in annihilating insects on some other shade trees, is the result of the following formula: two gallons of kerosene, one-half pound of laundry or fish-oil soap, and one gallon of water. Dissolve the soap in boiling water, remove the solution from the fire, immediately add the kerosene and thoroughly agitate the mixture for five minutes, until it becomes creamy—an emulsion. To each two gallons of water add emulsion: in fall and winter, one gallon; in summer, one-third gallon. Designed to terminate the existence of any insect, it can be applied with a variety of spraying devices, a tin atomizer

not being too crude for small trees. Power sprayers with fine nozzles are essential for extensive operations. Any of the standard miscible oils can be substituted for kerosene emulsion as a solution for spraying the bark. By the incorporation of one ounce of sodium arsenate in each gallon of water used for diluting kerosene emulsion or miscible oil, a number of species of tree borers are killed while young, by applying the mixture on the bark.

The Poplar Borer

The poplar borer is an inimical agent in the Middle and Western States, taking toll of the tree to which its name refers. Irregular formation, death of limbs, and the riddling of the trunk of the tree with holes of sufficient capacity to invoke the effectiveness of wind in divorcing its branches from the body, are the results of insect depredations to poplars. The tunneling stage of the borer is accomplished by a yellowish, cylindrical grub, distinguishable from other insects by the presence of numerous fine, short, hard points on a plate immediately back of the head. The larva negotiates mining operations the first year beneath the bark, and during the succeeding couple of years penetrates into the wood. Spraying of infested trunks with kerosene emulsion and digging out and killing the young borers in early fall are prescribed tactics for arresting the invasions of the pest.

The Hardy Tussock Moth

In spite of an abundance of parasitic insects which are its natural enemies in retarding the multiplication of its kind, the whitemarked tussock moth is of increasing menace to shade and park trees. It has formed acquaintance with a wide variety of trees, evidencing partiality for poplar, soft maple, elm, alder, birch and willow. The marks of its infestations are conspicuous, glistening white, frothy-looking egg masses, located low down on the trunk or on main limbs of the trees. The season for this evidence is from September until the following spring. The caterpillars hatch from overwintered eggs in April and May. Forthwith they begin skeletonizing the leaves, subsequently puncturing holes in the leafy growth and finally devouring all but the main veins. Seemingly, a quirk in nature perpetuates their destructive tactics, making a continuous story. As the tiny

creatures are suspended from a tree by a silken thread, a wind or a passing object may transport the insect to other trees, to continue its devastating efforts. The insect remains a caterpillar for a month or five weeks, shedding its skin five times. The eggs can be destroyed in winter, either by hand picking or scraping them off and burning or by spraying with creosote oil mixed with turpentine to keep it liquid in winter. Another method is to spray the infested foliage with lead arsenate, a violent stomach poison obtainable at seed stores.

A barrel pump mounted on a horse-drawn cart with one or two 50-100-foot leads of garden hose and a 10-foot bamboo rod with a spray nozzle at the end will meet the requirements of a small town.

The Bagworm

Shade trees, shrubs and evergreens sustain considerable injury from a caterpillar described as a bagworm, the name referring to the bag-like shelter which is a part of the equipment of the insect for undergoing the changes to which it is subject. After a series of transformations the bags are left clinging to leafless trees. The bagworm has a limited distribution, rarely appearing north of southern New York and the central portions of Pennsylvania and Ohio. Southward, however, it is a troublesome pest in robbing shade trees of their foliage, inflicting serious injuries in New Jersey, Pennsylvania, Maryland, Virginia, West Virginia, Ohio, Indiana and Illinois in 1907. A recurrence of similar serious visitations is not unlikely in the years ahead. The bagworm is most effectually combated by hand picking the bags in winter and

use of a 12-foot pole pruner. Another method which has proved its efficiency is to spray with Paris green in the proportion of one pound to 150 gallons of water.

The Hickory Bark-Beetle

The hickory bark-beetle is the most destructive insect enemy of hickory trees in the eastern United States, taking a toll of millions of trees in recent years. Fading and dying foliage in August and September betrays the ravages of the pest. A notable illustration of its destructiveness in recent

years was that achieved in Long Island. The presence of the beetle is unmistakably identified by centipede-like galleries in the inner bark and grooved on the surface of the wood. Trees thus afflicted should be marked and utilized for fuel during the winter. From November to June is the time specified for making effectual this work. "If this is not done, practically all the hickory trees may die within a few years," enjoins Dr. A. D. Hopkins of the Bureau of Entomology.

Methods of Control

Other than the application of an arsenical spray with

deadly effect, there are numerous artificial methods of control which serve to a relative degree in minimizing the yearly loss of \$10,000,000 exacted by insects in exploiting the verdure and vitality of shade trees. The fall canker worm, for illustration, can be successfully combated by placing some sticky substance or cotton bands around the trees as a means of forestalling the ascent of the female to the place where she deposits her eggs. Fortunately, the canker worm is a wingless creature, and its



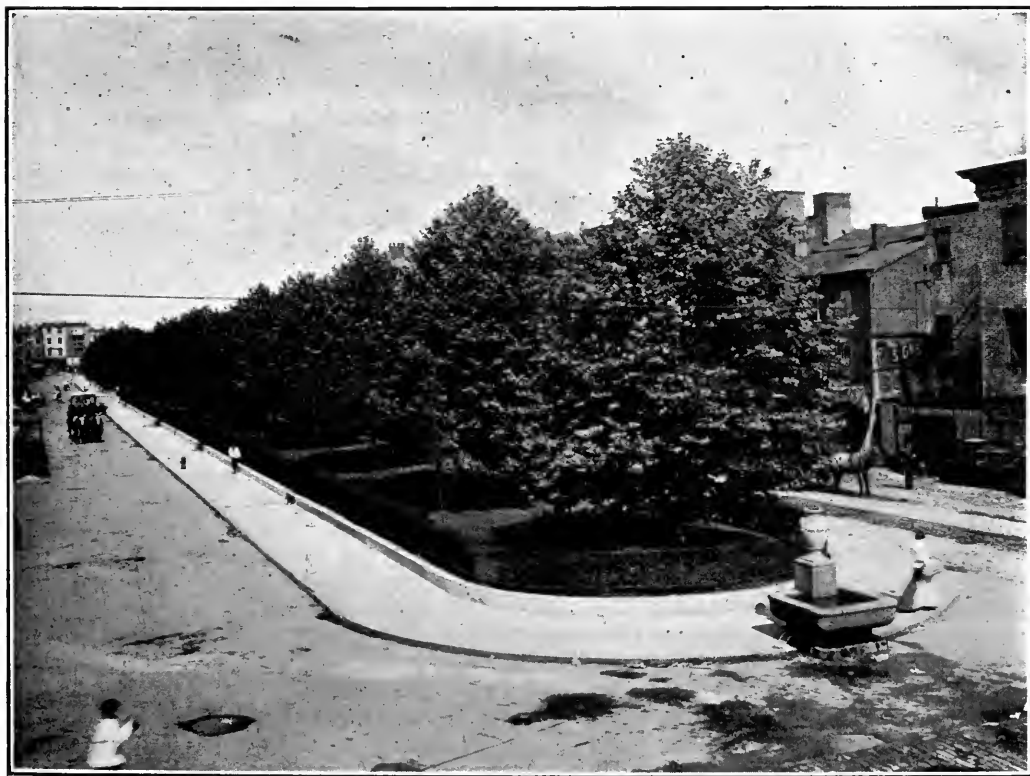
TREE IN BROOKLYN, N. Y., Banded to protect it from climbing caterpillars

for shade-tree beautification. The bands are placed in the fall and maintained until the end of May the following year. The cottonwood borer, whose ravages are inimical to the well-being of poplar and willow trees, is forestalled from perpetuating itself by a mechanical arrangement on this wise: A wire screen, up to one-half-inch mesh, is wrapped around the base of the tree, projecting itself about a foot above the ground and several inches into the ground. It fits snugly at the top and is an inch or two away from the bark the remainder of the way, thus preventing the beetles from laying their eggs in it.

Still another method of control is suggested in the warfare authorized on the leopard moth—an imported variety—which is proving a menace to the propagation of shade and ornamental trees along the Atlantic seaboard, from eastern Massachusetts to southern New Jersey, and in the Hudson River Valley. As the moth had intrenched itself in the public parks of New

York City, bisulphid of carbon was adopted as a remedy. The larvae of the leopard moth feed on living wood by tunneling operations rather than feeding on foliage; consequently, bisulphid of carbon is inserted into the apertures made by the pest, and the openings are forthwith closed with various substances. The death-dealing dose is injected into the burrows by a long-spouted oil can or a small glass syringe, which has the added convenience of determining the amount of bisulphid, and there is no threading to be injured by the reagent. A teaspoonful of the liquid is injected into each burrow. Putty and moist clay are ineffectual in daubing the holes and thus sealing the liquid, grafting wax being recommended as satisfactory. Coal tar can be used as a substitute, or the holes may be sealed by inserting a wooden plug and sawing it off even with the trunk of the tree. The object desired is a stopper, tight enough to exclude rain and the entrance of other injurious insects.

Breathing-Spaces in City Streets



A FEW TREES ADD TO THE BEAUTY AND COMFORT OF A CITY STREET

Color Characteristics of a New England Water-Supply

An Analysis of Various Feeders Provides Interesting Data for the Consideration of Municipal Engineers and Water-Works Superintendents

ONE of the matters which has to be given serious consideration in the choice of treatment of a water-supply is the question of color. While this is important only from the esthetic standpoint, still it is hard to secure the approval of citizens where the water delivered to consumers has a pale amber color in a drinking glass when resting on a white cloth. A color of less than 10 is practically always insisted upon. It has been found, however, that people accustomed to color of 15 to 20 become greatly pleased at a reduction, and should any recurrence of the higher colors appear, there is usually a great hue and cry.

Caleb Mills Saville, Chief Engineer, Board of Water Commissioners, Hartford, Conn., has given some very interesting data in a paper read before the annual convention of the New England Water Works Association, in September, 1920. He described the development of the Nepaug Reservoir, which is one of the late additions to the Hartford water-works. There are three principal streams entering the Nepaug Reservoir—Clear Brook, Phelps Brook and the Nepaug River. Clear Brook is a small, rapid stream draining an area of about 1.05 square miles and having its beginning in heavy gravel deposits. Only a very small amount of swampy land is tributary, and the color of the water rarely goes above 15, except in the spring of the year or under condition of storm run-off. Phelps Brook drains an area of about 2.9 square miles. There are several rather extensive swamp areas on its watershed, which account for the high colors recorded on the table reproduced herewith.

The Nepaug River drains an area of about 23.9 square miles. The course of the main stream is rather flat for this region. Where there are rather extensive meadow lands bordering, there are no areas of swamp or marsh land. Several tributaries, however, have their rise in somewhat extensive high swampy lands, and from these comes much of the color in the main stream. For the twelve months ending August 1, 1920, the

average and median colors are 30.5 and 31 respectively, with a minimum of 10 during the snow and ice run-off period, and 50 in June and November, the former due to a severe downpour of rain, and the latter to seasonal conditions.

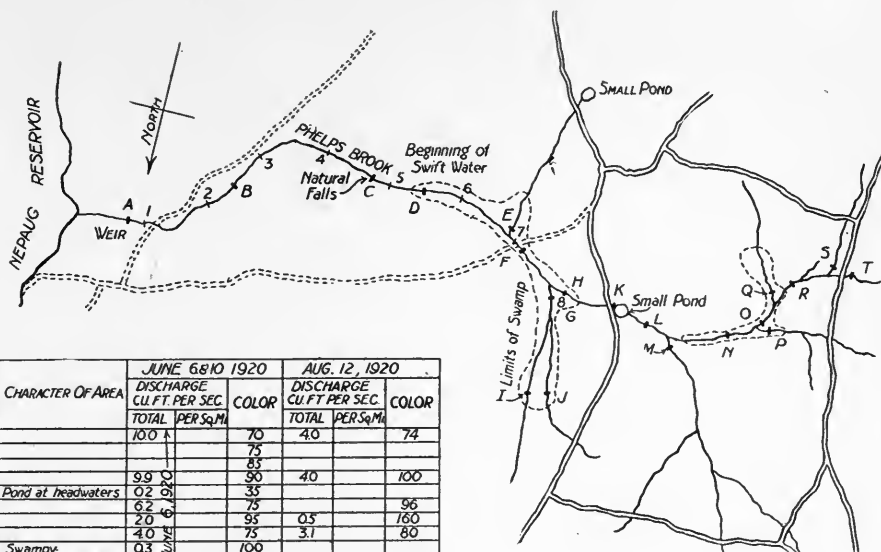
Phelps Brook Conditions

The accompanying sketch shows the principal part of the Phelps Brook watershed, and on the left is a table giving information obtained from observations made on two different occasions. A study of this shows some interesting facts which indicate the origin of the high color of this stream and suggest economical remedies.

Two of the larger swamp areas are enclosed in irregular dotted lines. At "A" is located a permanent weir with an automatic recording device, and there is a rain-gauge located not far from "M". The stream flow was measured at other places with a current meter, and colors determined both with a field glass and by laboratory comparison. Conditions may be understood by a brief analysis of the data tabulated.

Starting at "T," there is a color of 60 with a run-off of 9.4 cubic feet per second. A branch from the south, "S," brings a color of 22, and the combined color at "R" is found to be 55 at the head of the swamp. The several branches leading into this swamp differ considerably in color, "A" and "P" ranging as high as 75 and 90 respectively; the combined color at "N" with a flow of 0.9 cubic feet per second being 65. Nearly half of the water producing this color comes from the high-colored tributaries "P" and "Q." It is evident, therefore, that the first steps toward improvement should be taken on these streams. "M" with 0.4 cubic feet per second and a color of 55 mingling with the 65 color of "N" with its flow of 0.9 cubic feet per second, gives at "L" a total of 1.3 cubic feet per second and an actual color of 63 as against 63.5 color computed.

Similarly, down the stream high colors coming from "I" and "J" combine at "G"



POINT	TRIBUTARY AREA Sq. Mts.	CHARACTER OF AREA	JUNE 6/10 1920		AUG. 12, 1920	
			DISCHARGE CU. FT. PER SEC.	COLOR	DISCHARGE CU. FT. PER SEC.	COLOR
A			TOTAL 100	70	TOTAL 40	74
B				75		
C				85		
D			9.9	90	40	100
E		Pond at headwaters	0.2	35		
F			6.2	75		96
G			2.0	95	0.5	160
H			4.0	75	3.1	80
I		Swampy	0.3	100		
J		Muck hole at headwaters	0.4	85		
K			3.6	63	2.1	90
L			1.3	63		
M		Flat Partly wooded	0.4	35		
N			0.9	65		
O			0.6	60		
P		Swamps at headwaters	0.3	75		
Q			0.1	80		
R			0.5	55		
S		Steep, Wooded		22		
T		Swampy	0.4	60	0.5	75

Note: Points K&L are approx. the same. The reason the flows are so different is because they were taken on different days.

THE PHELPS BROOK WATERSHED WITH TABLE OF COLOR CHARACTERISTICS

in proportion to their discharges, and "G" combined with "H" produces a color of 75 at "F." "E" stream entering below "F" undoubtedly has some influence in reducing color, but the long swamp area to "D" is more than sufficient to counteract it. It appears from this study so far that streams "I" and "J" also will repay attention and that probably best results both in affusion and economy can be had here by attacking the entering streams before advancing to the more extensive swamp areas.

A most interesting phenomenon was observed in connection with this work, and duplicate observations were taken to make sure that there was no error either of observation or amount of water flowing in the stream. The elevation of the weir "A" is 516, while that of a point about 4,000 feet west along the brook, or 700 feet east of "C," is 675, a difference in elevation of 159 feet in 4,000. On June 6, the flow at "A" was 10 cubic feet per second, and the color 70. At "D" the flow was 9.9 cubic feet per second, with color 90. No elevation was taken at "D," but the brook has little fall between "C" and "D." With practically the

same flow at the two stations there was a reduction in color of 20.0. On August 12 check observations were made; the flow at "A" was 4 cubic feet per second, with color 74; the flow at "D" was 4 cubic feet per second, with color 100, a difference of 26.

As there are no entering streams between "D" and "A," and as the gagings show no appreciable inflow of low-colored spring water, the conclusion seems warranted that because of the swift water from "D" to "A" there is a reduction of color from 20 to 26 points in a distance of about one mile. Similar work to the above is being undertaken on the Nepaug River stream, and as maintaining forces are available, work will be done from time to time, attacking first those locations where the greatest amount of color is evident. A survey of this character is comparatively inexpensive and often results in much economy by undertaking work to remedy the root of the trouble rather than starting on the more spectacular project of extensive swamp drainage. The latter is often disappointing in failing to get results commensurate with outlay because of lack of careful diagnosis.

The Change in Attitude of the Public and Public Service Companies Toward State Regulation

By Farley Gannett

Gannett, Seelye and Fleming, Harrisburg, Pa.

A FEW years ago a lawyer friend of mine, whose specialty was corporation law, and whose practice was largely before state regulatory commissions, told me this incident in his practice.

One day the President of probably the largest utility in the state came to him to retain him to assist in putting a rate increase through the Public Service Commission. This was a most attractive and valuable commission, and one most desired by many attorneys and particularly so by my friend, whose practice was young but growing.

The lawyer thanked the President and asked why he came to him when the utility's regular attorney, a man of national reputation, was still under retainer and able to look after his client's affairs. The President replied that he wanted them both; that he recognized that my friend specialized in this class of work, resided in the state capital city, and would be of much value to his company. My friend again thanked the President and declined his retainer, much to the latter's astonishment. When asked his reason, he said that he could not take the case unless he took it alone; that he recognized the ability of the company's regular attorney, who, however, had not yet learned that public utilities were under state regulation, and he was too old to learn it. The old attorney has since passed on, and my friend's firm now represents the utility.

There are still many lawyers who cannot make up their minds to the new idea of state regulation; and there are probably more operators of utilities who cannot. The older men are passing on or becoming convinced of the actual conditions, and these last few years have seen a vast change in their attitude. The utility has learned that far more can be gained by playing fair and honestly with the commissions and the public than by practicing subterfuge, withholding facts and attempting to befuddle the authorities.

When governmental control of public service corporations was first discussed some

twenty years ago, the idea was quite generally objected to by the companies. Gradually this attitude was modified and softened until most of the states enacted laws organizing public utility commissions. The older men in the business could not at first understand or countenance interference in their business by the public utility commissions. The rising prices of recent years have, however, so brought home to them the advantages of state control that they fear and dread the possibility of losing such control, which carries with it protection. In other words, they see that it is not one-sided control. The company is controlled, but so is the public. The commissions have prevented the public from keeping rates fixed by ordinance or agreement at such low levels as to drive the companies into receiverships.

Utility Commissions Act as Buffers

And now the utilities fear that the Legislature of Illinois may do away with the Public Utility Commission of that state. They fear that by so doing the utilities will become "a political football." They want the protection of the Commission, even though they do sometimes reduce the profits, operating salaries and management fees, and criticize managerial methods of the utilities. Utilities realize that it is due to the public utility commissions alone that many of them are able to live and do business.

These are of course hard days for the public service commissions, called into being by the public to prevent undue profits by monopolies, and to protect those monopolies, recognized as properly so, in their investments. These commissions for the last few years have had to say "yes" to the great majority of applications for rate increases, because of advancing costs of operation and maintenance. The public is dissatisfied with the creature it created. It is not keeping rates for gas, water, electricity, trolleys and telephones down, but constantly permitting them to mount higher and higher.

If it had not been for the public utility

commissions, where would the utilities be to-day, with their ordinances calling for five-cent fares, fixed water and gas rates, etc.? Imagine the controversies between city and company officials when attempts were made to alter existing ordinances. The situation in New York between the Mayor and the trolley company would have been repeated thousands of times. As it is, a great many public utilities, chiefly gas and trolley companies, have succumbed and gone into receivers' hands, but how many more would have done so were it not possible in many states to forget ordinances and contracts which set rates and fall back on the power of the public utility commissions to regulate them equitably! Thus, that which was the protection of the public a few years ago is now considered by the public to be its menace, and that which in the mind of the utility operator menaced the life of the utility and took away its individuality and independence, is now its protector.

If costs have really started to reach a permanently lower level, the utilities have the prospect of lower operating and maintenance costs before long. Will they be as quick to reduce rates when costs are lower as they have been to raise them—and should they? There is a lag between the time increased rates are needed and the actual results of rate raises. In those states where the law provides that approval must be obtained before rates are raised, this lag is great and its effect sometimes disastrous. In those states where new rates merely have to be filed thirty days in advance of the date they are effective, the lag is not so great, but it is considerable, for it sometimes takes months to get the new schedule in shape for filing.

Utilities may be pardoned in some cases if they postpone rate reductions until after they have recouped the losses incurred during this period of lag, but as a rule the companies will probably not rush to reduce rates, and we may expect that the cities will before long begin actions before the commissions, asking for rate reductions based on reduced operating expenses. Thus, before many years, or it may only be months, the commissions will have a chance to square themselves with the public by ordering rate reductions in the majority of cases which come before them. When this time arrives, will the utilities then attempt to oust the commissions, as the public is doing in some

states now? I do not think they will.

It is to be hoped that the utilities will carefully watch their balance sheets and will play the game to the extent of keeping the rates down on the basis of reduced cost of service if that cost does become less. It is to be hoped that they will not wait to be driven down by complaints to the commissions, and it is also to be hoped that the public will be patient and give the utilities time to recoup some of the money lost during the lag period, before starting suits before the commissions asking for reductions.

It may be fairly said that public utility rates did not rise as rapidly or as high as wages and prices of most other commodities did during the war, and subsequently. Perhaps some of the companies were earning so well under pre-war conditions as not to need much increase, and didn't want to run the risk of valuations by commissions. Others hoped that costs would soon cease their upward trend and start down, and thus postponed rate revisions. There are a large number of companies which have not increased rates at all during this period.

All in all, it would seem, when the problem is studied as a whole, that the public utility companies have come through the trying period of the last three years with a record which the public should appreciate. This situation should be made clear to the public by someone who is willing to collect the data, and the result would be to put the utilities in a good light in the eyes of the understanding section of the public. Now the utilities must not mar this record by trying to make the increases, which have been necessarily made, permanent—a permanent additional burden on the public. Of course the utilities are not entirely responsible for their good record during the war, as to increased rates. Had there been no commission control there would probably have been chaos. Some companies, which could do so, would have undoubtedly advanced rates out of proportion to rising costs, while others, those which had their rates bound by contracts and ordinances, would have succumbed and gone into receiverships. The fairly even tenor of the way of the utility during the war and post-war period can be credited to commission control. It has kept increases reasonable, and far below the increases in most other things, and at the same time it has saved the financial life of innumerable corporations.

Street Flushing for Cleanliness

Descriptive Material and Cost Data of Value to Municipal Officials

STREET flushing is being increasingly used by cities throughout the United States, supplanting the inefficient hand-sweeping method. Power flushers wash the surface of asphalt, brick, and concrete and other hard-surfaced pavements by directing streams of water from fan-shaped nozzles under pressure onto the pavement, chiseling off the dirt, scraping the surface, and carrying the refuse into the gutters. The pressure at which the water is thrown onto the pavement is obtained from a separate gasoline engine mounted between the driver's seat and the tank, which makes it entirely independent of the truck engine.

The flushing units are so made that they can be used with one, two or three nozzles operating at a time. Three nozzles are used to clean the street from curb to curb on one trip, using one front and two side nozzles. Two nozzles are used at one time when cleaning exceptionally wide streets or streets having car tracks in the center. In this case the left front and right side nozzles should be used, or vice versa. Only one nozzle is used when an exceedingly high pressure is required for spring clean-up or for streets which would ordinarily require a scraper to remove the dirt.

When streets are covered with dirt that is hard and dry and baked to the surface, it is well to sprinkle before flushing in order to soften the material, which increases flusher efficiency about 50 per cent. Flushers are also equipped with sprinkler heads located at the front of the machine and fitted with a three-way cock, so that the operating levers controlling the front nozzles can be used to control the sprinkler heads also. These sprinkler heads throw a wide fan-shaped stream in front of the truck, covering a strip of 60 feet, which can be decreased to 30 feet by reducing the speed of the flusher engine.

The first method of street cleaning used was the "White Wing," the man with the push broom and cart. This is also the most expensive when present-day labor costs are considered. One motor-operated flusher can do the work of 20 White Wings. Horse-drawn sweepers were formerly used quite commonly up to the time flushers were

placed on the market, but this method does not remove the fine particles of street dust, which is readily blown about by the wind. One flusher can do the work of about six horse-drawn sweepers.

Operating and Cost Data

In Cedar Rapids, Iowa, the flushers begin to operate at 4 o'clock in the morning. The first territory to be cleaned each day is the business district, and this is done at the early hour to avoid the heavy traffic. During the day from 8 o'clock the residence district is taken care of, covering about 60 miles of paving. The flusher covers this territory once every 12 days. Two men are employed on the flusher at an average daily expense of \$15. The dirt forced by the flusher into the gutter is picked up by a gang that follows the machine continually. Flat sewers do not permit the flushing of this dirt into the catch-basins, so that it is necessary to clean out the gutters continuously.

In Waxahachie, Tex., 71,000 square yards of street are flushed daily by a Pierce-Arrow truck with Studebaker model flusher. This machine has been in operation since June 1, 1919, and the total cost for repairs and parts to date has been \$36. It is operated by a competent man, who is very careful, and the streets are kept exceptionally clean.

About 2 miles of paved street in Tyler, Tex., are flushed each night, with the exception of Sunday night. This usually requires about 6 hours per night and about 30 tanks of water to do the work. The flusher is equipped with a 1,200-gallon tank. During the summer months the flusher is used during the day as a sprinkler in order to lay the dust on public streets, and covers about 2 miles a day in this way, twice each day. The expense of operation of the flusher averages about \$350 a month.

The city of Chicago operates one double-unit flushing equipment and a single-unit, both of which operate satisfactorily. These machines were delivered in September, 1920, and have been operating in the down-town section of the city. Twelve miles of streets are flushed nightly between 10 P. M. and 6

A. M. at a cost of 13.4 cents per 1,000 square yards. Six additional Mack flushers will be put into commission this spring, and will radiate from the business section on the principal thoroughfares, serving a district approximately 11 miles long by 4 miles wide, each flusher working 16 hours per day.

The Department of Streets and Public Improvements, Des Moines, Iowa, reports that the cost of operation depends considerably upon weather conditions, but conservatively, during an 8-hour period they are able

flusher showed the following results: The machine was in operation 237 minutes, of which 63½ minutes were used for loading, 75 minutes were used for discharging, and 98½ minutes spent in backing, starting, etc.; 17 tank loads were distributed, making a total of 25,000 gallons used for flushing, and 10.75 blocks were flushed per hour. The following table gives the cost of operation of this machine per 8-hour day:

Auto driver	\$4.50
Helper	4.00
Gasoline (15 gallons at 29 cents).....	4.35



STREET FLUSHER AT WORK IN TYLER, TEXAS, WITH TWO NOZZLES OPERATING

to flush approximately 78,600 square yards with 34,000 gallons of water. It takes approximately 20 gallons of gasoline and 2 gallons of oil for the same period, which includes the amount used in the auxiliary motor as well as for the truck proper. This, with the wages of the operators, amounts to \$10.12, constituting the total expense of operating outside of maintenance, which has been very slight in the two years the machine has been operated.

The Department of Street Cleaning, Richmond, Va., reports that under test the

Oil .....	.35
Grease .....	.10
Depreciation (\$8,500—15 per cent).....	3.50
Interest (6 per cent on \$8,500).....	1.40

Total cost per day (8 hours)..... \$18.20

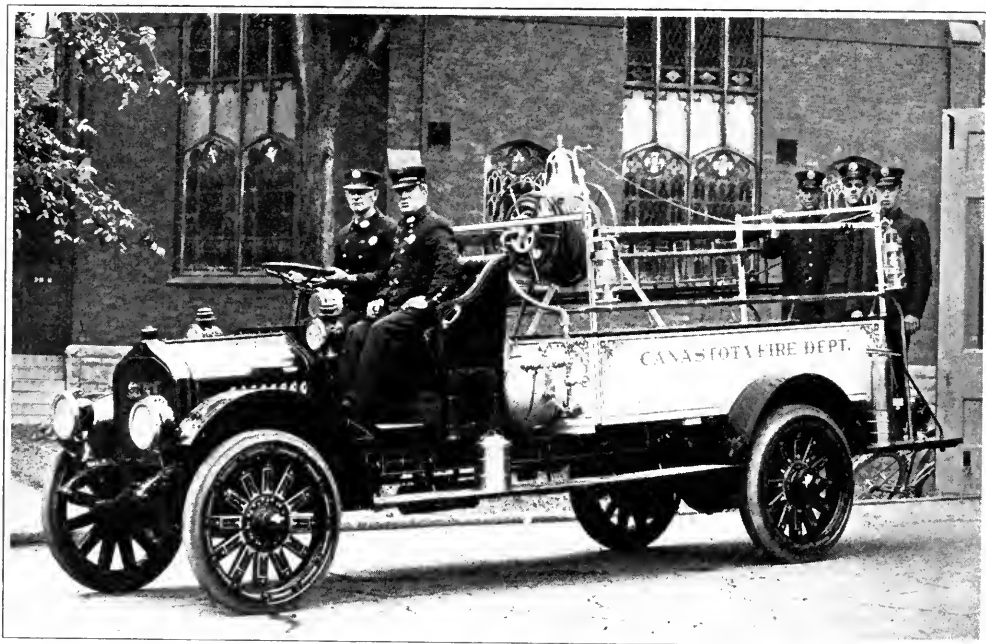
The Bureau of Streets, New Haven, Conn., uses a 5-ton Larrabee chassis with Studebaker attachment. The average results accomplished by this machine in a 9-hour day are as follows:

Street area flushed.....	303.713 square yards
Street area sprinkled.....	46.058 square yards
Amount of gasoline consumed...	17 gallons
Amount of oil consumed.....	1½ quarts
Wages of driver.....	\$4.50 per day
Wages of helper.....	\$3.50 per day

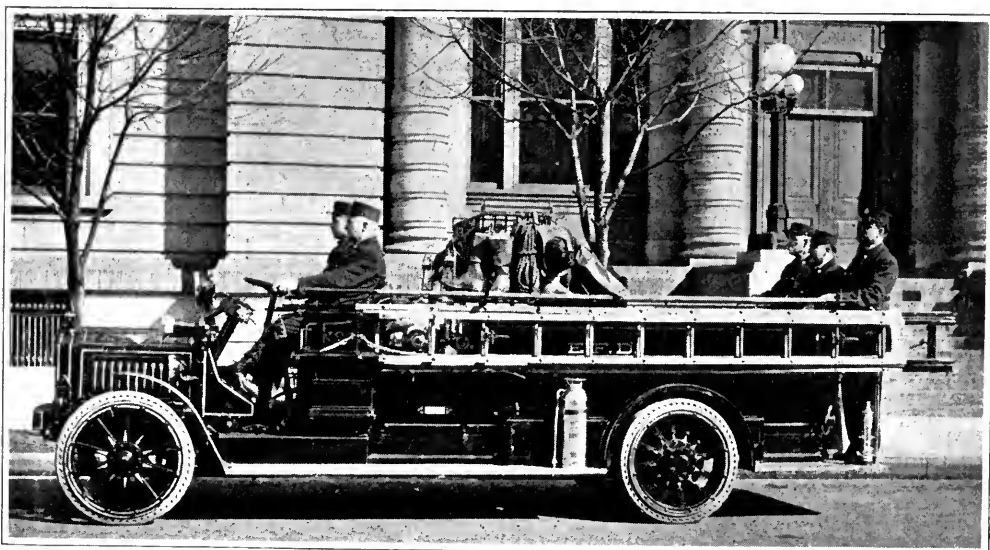
The Value of a Gravel Survey

Iowa gravel hunters working under the direction of the State Highway Commission, undoubtedly saved the state of Iowa on the construction work of 1920—to say nothing of additional savings in this and later years—more than \$100,000. In this survey undeveloped gravel deposits were examined in 24 counties, and searches made for entirely new deposits.

How Near Complete Motorization Are Your Municipal Departments?



A SELDEN CHEMICAL AND SERVICE TRUCK USED BY THE FIRE DEPARTMENT OF CANASTOTA, N. Y.

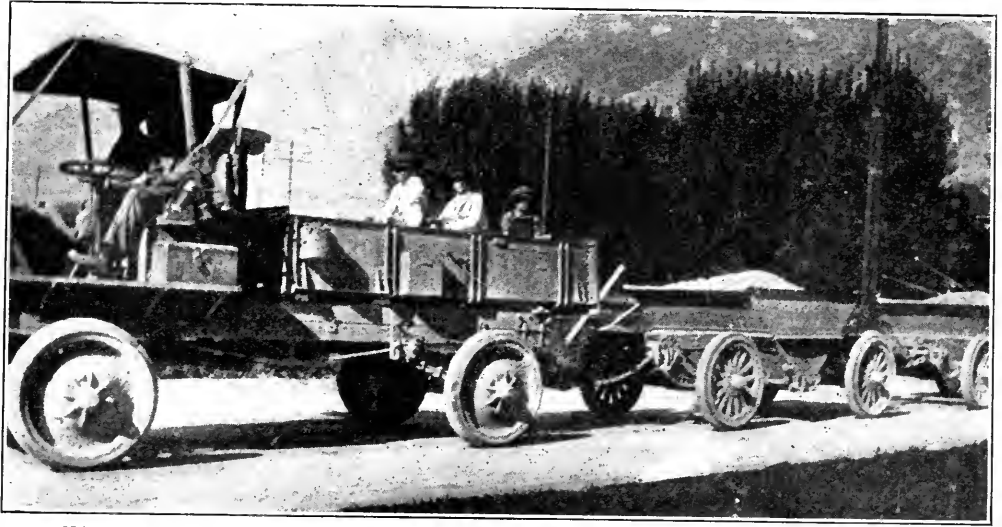


ONE-TON PACKARD CHEMICAL AND HOSE TRUCK PUT INTO SERVICE MARCH 1, 1916, BY THE CITY OF ELGIN, ILL.

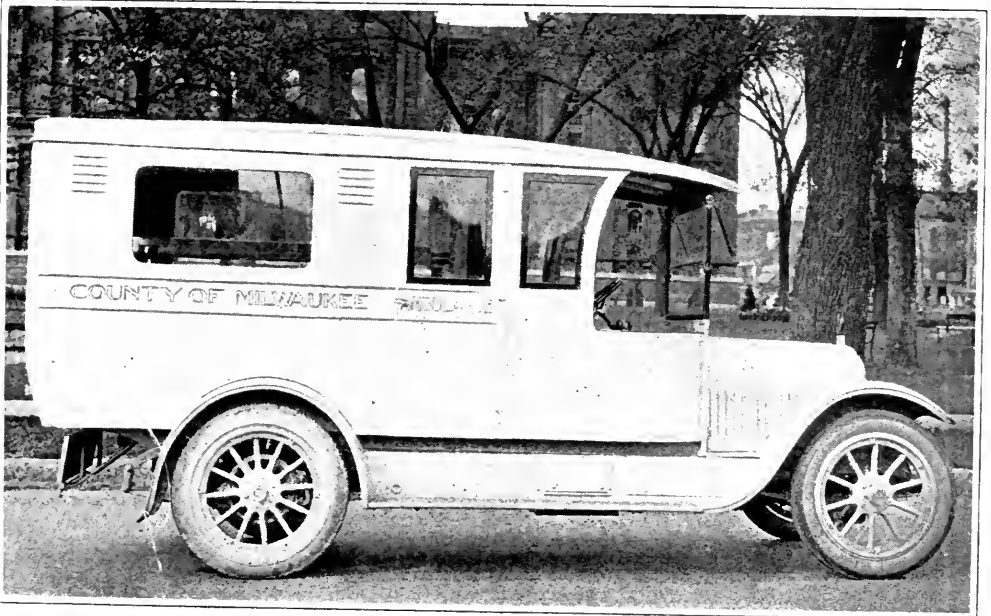
The truck is equipped with one 40-gallon chemical tank, 200 feet of $\frac{3}{4}$ -inch chemical hose, two 16-foot trussed roof ladders, one 26-foot rope hoist extension ladder, one 10-foot ladder, two pike poles, 900 feet of $2\frac{1}{2}$ -inch hose, nozzles, etc. Weight 9,100 pounds. No. 2 and No. 5 trucks of this department are of the same type and were put in service in April and October, 1916; maximum speed 37 miles per hour; on October, 1920, No. 3, a Nash-Quad four-wheel drive with same equipment and a maximum speed of 27 miles per hour



MOTORCYCLE POLICEMEN AND PATROLS IN FORMATION FOR REVIEW



NASH-QUAD TRUCK HAULING LEE TRAILERS FOR PROVO CITY, UTAH, ROAD WORK



AN AMBULANCE FOR MILWAUKEE COUNTY, WIS., MADE BY THE WHITE COMPANY

Motorization of New York City Departments

By Rebecca B. Rankin

Librarian, Municipal Reference Library, New York City

IN the November, 1920, issue of THE AMERICAN CITY there appeared an article entitled "Motorizing American City Departments." Here attention was called to the use of the passenger automobile as a means of speeding up the various departments of the city administration. The Municipal Reference Library has made a survey of the city departments of Greater New York, ascertaining the number of automobiles used by the various departments. The following data are given to supplement the above-mentioned article. As is to be expected, since the city of New York is the largest in the country, the use of the automobile is also greater than in any of the other cities as shown by the National Automobile Chamber of Commerce survey. In that survey Detroit stands highest, with a total of 616 pieces of motor apparatus. New York City has a total of 1,608 motor vehicles; of this number 326 are passenger cars. The ambulances used by the city number 51, and there are 107 police motorcycles.

The Fire Department seems to have been the first to consider using motor vehicles instead of horses. It was done for the saving effected in maintenance. In 1910 the Department experimented with one motor high-pressure hose wagon; it cost for maintenance and fuel for one year only \$85, and

maintenance of horses necessary for the same apparatus would have cost \$660. The Fire Department is now 80 per cent motorized, and there are no fire horses used in the borough of Manhattan.

In the table below, the motor-vehicles are classed roughly. Under the heading "Trucks" are included fire trucks and dumpers; with "Patrol Wagons" are included hose wagons; with "ambulances" are prison vans. In the case of the Street Cleaning Department the new snow-cleaning apparatus which has recently been ordered but not yet received is included under "Trucks." Two garages are now under construction, and thirteen others are being planned for the housing of this street-cleaning equipment. The appropriation of \$4,000,000 for this purpose by the Board of Estimate and Apportionment which was made on June 4, 1920, includes money for the building of one central repair shop and twenty-two garages.

Despite all the care that has been used in acquiring and compiling this information concerning motorization, we cannot vouch that it is entirely complete nor without inaccuracies. It has been necessary to omit one or two departments from which the figures could not be obtained. At least, it approximates the actual conditions in New York City departments.

MOTOR VEHICLES OWNED BY CITY OF NEW YORK SEPTEMBER, 1920

	Ambulances	Passenger Cars	Trucks, Including Fire Trucks and Gasoline Pumps	Motor-Cycles	Patrol and Hose Wagons	Tractors	Delivery Wagons and Working Cars	Totals
Ambulance Service, Bd. of.....	10	2	...	...	...	...	...	10
Botanical Garden.....	...	1	...	...	...	...	...	1
Corrections.....	11	1	...	...	...	...	3	15
Docks and Ferries.....	1	1	...	...	...	...	...	2
Education.....	12	8	...	...	...	...	...	20
Fire.....	91	132	...	...	137	162	23	559
Health.....	8	12	...	...	...	...	...	23
Hospitals.....	19	2	...	...	...	...	...	22
Municipal Garage.....	81	...	...	...	...	...	...	81
Parks.....	9	41	...	...	...	...	...	50
Police.....	39	107	...	...	29	...	...	175
Public Libraries.....	2	...	...	...	...	...	4	6
Public Welfare.....	...	2	...	...	...	...	10	14
Public Works.....	12	44	...	...	...	...	...	56
Street Cleaning.....	31	347	...	...	...	23	...	401
Water Supply, Gas and Electricity..	36	62	...	...	...	2	74	174
Zoological Garden.....	...	2	...	...	...	...	...	2
Totals	51	326	652	107	166	187	119	1,608

Efficient Industry and Wholesome Housing True Aims of Zoning

By Thomas Adams

Town Planning Advisor to the Commission of Conservation, Ottawa, Can.

THE phase of city planning which appears to have caught the public fancy to the greatest degree in recent years is that known as "zoning" or "districting." Zoning has been defined as "determination of the character and intensity of the use of land" and involves the division of cities and towns into different districts for the purpose of regulating the height and use of buildings and the percentage of the lots occupied by buildings. In any regional or city plan, zoning must be an important feature. The early plans prepared for cities in the United States and Canada were chiefly defective in that they omitted to deal with the control of the character and intensity of use of land for building purposes. No matter how good the plan of the street system of a city may be, it will be an imperfect plan if it does not include both the control of the building development and the adjustment of that development to the plan of the transportation and street system.

The Defects of Earlier Plans

In earlier plans the emphasis was placed on transportation, park systems, and civic centers, and little, if any, attention was given to equally important and more fundamental phases of the industrial and residential development of the cities. This resulted in many good transportation schemes lacking permanence in meeting the problems for which they were designed to find the solution. In so far as the plans were confined to partly esthetic purposes, such as parks and civic centers, they have usually failed to obtain sufficient support to bring them to fruition, because of having these purposes dealt with apart from the other parts of city development. The present tendency is leaning towards the other extreme, and in some places where zoning is being carried out the error is made of dealing with the segregation of industries, business and residences as a separate thing from, or even without relation to, such matters as transportation, main arterial highways, housing and parks.

Transportation and Zoning

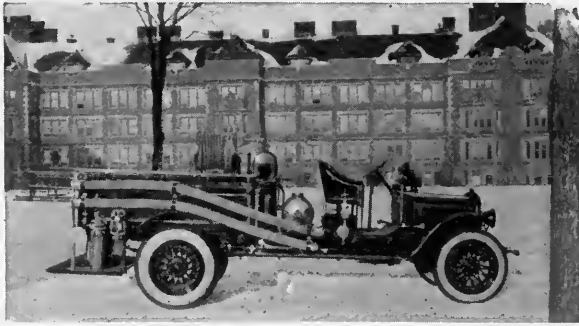
The railroad system of transportation and termini within and about the city and the arterial system of highways which provides the main means of communication by road for the city are of exceptional importance in relation to the zoning plan of a city. Both have a direct bearing on the segregation of industrial areas and on the convenience of the means of transit between these areas and the homes of the people.

We shall fail to plan properly so long as we ignore the fact that the fundamental matters for study and planning in the city are industries and homes. The means of transportation is an essential service, but only a service to procure efficiency and health in the industries and living conditions of the people. The park system is an essential service for the same object. The lesson has still to be learned that regard must be paid to all the elements of civic growth in a proper city planning scheme and that zoning should not be considered as a thing apart from other aspects. This does not mean that the writer lacks appreciation of the enormous benefits which are being conferred on some American cities as a result of the zoning that has been carried out independently of a general city plan. Where the zoning schemes, however, have been based on an adequate and comprehensive survey and have been part of a general plan, they possess the elements that are likely to make them really effective and enduring in good result.

Preliminary Survey Essential

Whether or not a city prepares a complete plan or confines itself to a zoning plan and ordinance, it should at least have made a survey not only of its own area, but in some degree at least of the adjacent region, as a first step. No successful and equitable form of land and building classification and control can be made without adequate studies of the existing conditions, accompanied by expert study of the tendencies of development. It is interesting to observe

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that in America zoning is largely confined to the built-up part of cities, whereas in England it forms the most important part of town planning schemes for unbuilt or partially developed land, and has little connection with areas already built upon. Both the American and English systems are defective in respect of what they omit. The best planning combines the advantages of both systems and place the emphasis neither on the land built on nor on the undeveloped land.

Control of Suburban Development

Probably there is no greater problem on this continent than that of the control of new development in the suburbs, and this involves that zoning regulations should be made in respect of future building development in suburban and semi-rural areas as well as in respect of land already covered with buildings. Indeed, the greatest opportunities for successful zoning are those which are available in the undeveloped and partially developed suburbs surrounding great cities, where vested interests in existing buildings have not yet been created. The question of zoning cannot be separated from the question of industrial distribution. In all large cities there is going on a certain amount of decentralization of industry, and the worst evils of bad development are occurring in the outer suburbs where new industrial development is taking place.

Segregation Must be Scientific and Not Anti-Social

There are two important considerations in connection with zoning which have not yet received sufficient attention. One relates to the social problems that will arise in connection with the segregation of residential districts. It will be an unfortunate result of zoning if it divides cities into sectional groups of rich and poor to a greater extent than at present. The ideal to aim at is to prevent the erection of one kind of building that will injure another kind of building, with a minimum regard to the social status of those who live in them. Zoning will defeat itself in a democratic country if it becomes anti-social, or emphasizes distinction of class, as a movement.

The second question is, whether by zoning industrial districts, without regard to the general city plan, industries will be segregated still more than at present from the homes of the workers. The segregation

of industries into one part of the city will be a bad and not a good thing if it is done without adequate care of the housing conditions and convenience of transit for the workers. This is not only sound from a theoretical point of view but is the practical judgment of manufacturers, and it has been the only reason they have put forward in opposition to zoning. In zoning a city as part of a comprehensive plan, the expert who knows his business would segregate the industrial and residential areas and yet so relate them to each other and the system of transportation that the workers would be within easy reach of their places of employment. What matters most is not the distance men live from their work but the time it takes them to get to and from it. Proper zoning would have special regard to the necessity for giving the manufacturer housing accommodation near to his plant, which is one of his biggest problems. The representative of a large industrial corporation in America, writing of the kind of industrial zone which is sometimes created, says:

"The question of transporting employes from their homes to the factory is daily becoming more burdensome, due to the increased cost of labor and materials, so that if the workmen live at a great distance from their work they are not only occupying a greater length of time going to and from their work, but the fares on the steam railway or tram system are absorbing a large amount of their pay envelopes."

For that reason he said he was opposed to zoning. Of course a zoning system that would lead to this result would be wrong, but it is precisely the result that proper zoning would avoid if it were carried out as part of a general city plan. Our danger is that in doing the thing that is most expedient at the moment we may fail to do the thing that will be permanently practical and profitable. Efficiency of industries and wholesome housing are of vital importance in the development of the city; other things are vital in proportion as they minister to these things. The kind of zoning scheme that has for its main object the stabilizing of real estate values, essential as that is, will accomplish little in improving a city unless it simultaneously develops the facilities for carrying on the industry that is the *raison d'être* of the city and improves the convenience and health of the home life of the average citizen.

THE AMERICAN CITY

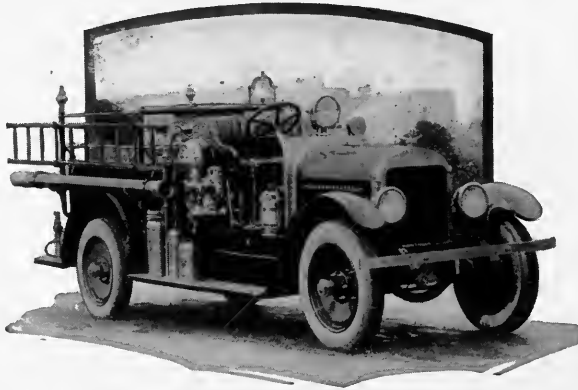
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State Referenda and the Municipalities in the 1920 Elections

By William A. Robinson

Department of Political Science, Dartmouth College

NOVEMBER 2, 1920, saw the submission of the usual biennial list of constitutional amendments and statutory enactments on already overburdened state ballots. In addition, the municipal voter was called upon to pass judgment on a variety of purely local projects. Most of the state propositions were of interest to the municipal electorate. When West Virginia, New Jersey, Missouri or Idaho authorizes huge bond issues for highway construction, it is naturally a matter of serious interest to their municipal taxpayers, who usually contribute more than their fair proportion of state taxes. The same is true of the soldier's bonus authorized in half a dozen states, or the income tax amendments rejected in Minnesota, Maine and New Hampshire. But in addition to such measures which are of interest to the city voter in the states concerned, there were a few propositions of general interest to those concerned in municipal activities.

Some measures illustrate the fundamental weakness in the relations of state and city and constitute a strikingly effective argument for home rule. The voters of Colorado, for example, voted favorably on an initiated measure making it unlawful to require employes in any municipal fire department to remain on duty in any calendar month more than an average of twelve hours a day except in time of emergency. In Louisiana, the voters accepted an amendment to the constitution directing the city of New Orleans to levy annually a tax not exceeding two mills on the dollar for the inauguration and maintenance of the double-platoon system in the fire department and the triple-platoon system in the police de-

partment, and for the increase of salaries and wages in both. In such cases a system which allowed municipalities a free hand in settling their own employment problems would seem desirable.

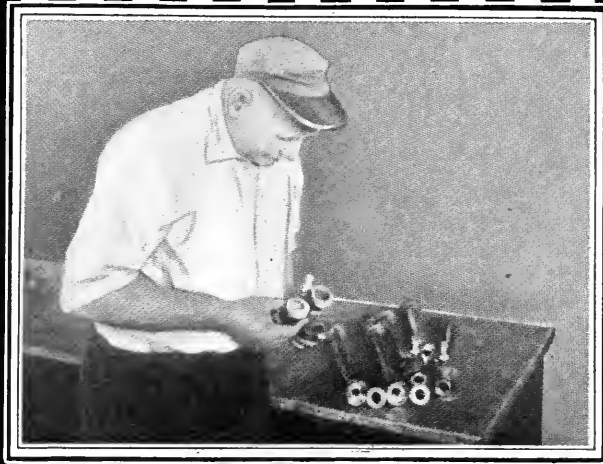
Missouri voted for two important constitutional amendments. The first allows cities having a population of more than 100,000 a simpler method of charter making, providing for the election of the charter commission on a non-partisan ballot after nomination by petition. The second permits cities of over 75,000 population to acquire water-works, gas-works, electric light works, street railways, heating, ice, or refrigerating plants or other public utilities, without conflict with prior debt limitations. South Carolina also adopted an amendment empowering cities and towns to acquire and operate ice plants.

SUBJECTS INCLUDED AMONG THE 1920 REFERENDA

Hours of Duty for Firemen
Platoon System in Police and Fire
Departments
Election of Charter Commissioners
Debt Limitations and Municipal
Ownership
Debt and Tax Limitations
Excess Condemnation
Compulsory Attendance in Public
Schools

Meeting the In- creased Costs of Government

In a number of states the growing demand for improvements and the increasing cost of government have led to proposals to relax both debt and tax limitations. Pennsylvania voted for an amendment placing a debt limitation on counties, cities and boroughs of 7 per cent of the taxable valuation, with 10 per cent in the case of Philadelphia, and an additional deduction of debts incurred for income-producing property. Wyoming, on the other hand, voted down four amendments authorizing increased tax levies and larger debts, accepting only the proposition that school districts might create additional indebtedness for the erection and enlargement of school buildings. South Carolina voted for the modification of constitutional debt limitations applying to more than twenty cities and



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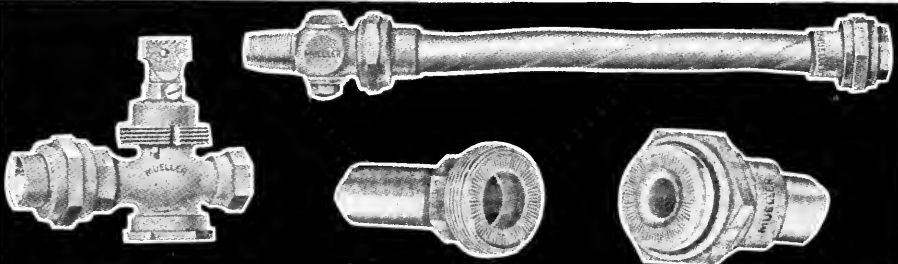
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towns. Virginia voted to allow an increase of local taxes for school purposes.

In Michigan there were two amendments of considerable interest. One was a decidedly dangerous proposition, which, under the form of compelling attendance at the public schools of all children between five and sixteen years of age, would probably have necessitated the suppression of parochial and other private schools. While it is satisfactory to record the rejection of this measure, the same is hardly true of the defeat of the other. This authorized the Legislature to empower cities, subject to reasonable limitations, to condemn and take the fee to more land and property than is needed in the acquiring, opening and widening of parks, boulevards or land for other public uses, and to sell or lease the remainder after such improvements are made, any bonded indebtedness so acquired not to be included under any limitations on indebtedness, but to constitute a lien only in the property so acquired. Excess condemnation has definite possibilities and advantages of which few American cities have been free to avail themselves, and it is to be regretted that it could not have been tried out in Michigan.

In Louisiana and Oregon constitutional amendments were submitted providing for an improved and consolidated administration of the respective ports of New Orleans and Portland. In the former state the amendment was adopted, in the latter defeated by a narrow majority. In Louisiana the only amendment failing to carry, out of eight submitted, was one proposing a ten-year tax exemption for industries locating on the Navigation Canal.

Virginia, in defining qualifications for voting and office holding, accepted an amendment exempting from residence and

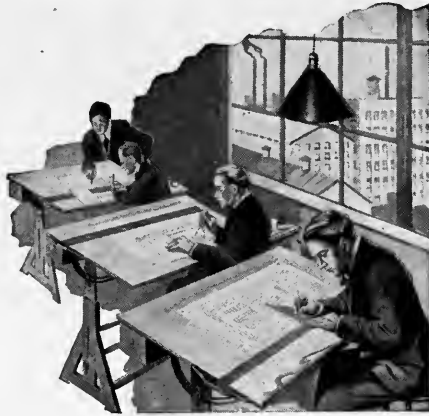
voting qualifications office holders under municipal governments of whom special or technical learning is required. By other amendments women were declared eligible for the office of school trustee, and a greater measure of power in adopting charters was granted to municipalities.

In California and Oregon single tax amendments were decisively beaten, together with anti-compulsory vaccination proposals. The latter state also defeated an initiative measure creating a State Market Commission for the purpose of promoting better relations between the agricultural producer and the ultimate consumer. South Dakota accepted an interesting amendment proposing to use the credit of the state for the acquisition of urban homes, an extension of the same principle involved in the rural credits scheme now in operation.

These measures are of course of direct municipal interest, but it must be evident to anyone who has examined the mass of measures submitted in some of the states that the municipal voter has a special responsibility. The urban electorate has more access to sources of information on public questions, and conflicting interests are better balanced. If, as seems likely, the burden of direct legislation and the referendum is to grow, the municipal voter with his advantages in the way of political education has unusual opportunities of service to the state. The growth in public indebtedness and taxation is ominous; the general willingness to authorize expenditures or to demand increased public services is aggravating a situation already serious. The municipality in most states is carrying a disproportionate share of public burdens. Self-interest alone should demand a careful weighing of measures and a vigorous participation in state politics.

The knowledge acquired by education must, ultimately and alone, be trusted to bring home to a nation that the acquisition of health means the acquisition of wealth.—Sykes.

—Public Health News, New Jersey State Department of Health.



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Hydroelectric Power for American Cities

By James P. Wells

Consulting Engineer, Rochester, N. Y.

DURING the last ten or fifteen years much has been said about developing the water-powers of the United States. There has been considerable legislation, a vast amount of material printed on the subject and a great volume of oratory. In spite of all this, only a relatively small amount of the water-power available in the country has been developed. At the present time there is again a widespread agitation for the development of water-power, and it is worth while to mention some of the structures used in modern hydroelectric development, and to outline the preliminary steps necessary toward developing water-power.

Certain structures and machines are necessary in the construction of almost every hydroelectric power-plant: first, there must be a dam of some nature; second, a conduit to carry the water from the dam to the turbines in the power-house; third, hydraulic machinery to develop the power; fourth, electrical generators to manufacture electricity; fifth, a transmission line. The size and character of these different factors will depend upon the particular conditions.

Dams and Conduits

There are several types of dams. There is an earthen dam with a concrete core wall in the center. Under certain conditions this would be the most economical construction. There are the masonry dam, the arch dam, the reinforced concrete dam and the rock fill dam. Many dams of all these different types have been built all over the United States. Probably the most common types are the earthen dam and the masonry dam.

From the dam to the power-house there will be a conduit. The character of the conduit will depend, as in the case of the dam, upon the particular conditions existing at the proposed power development site. If the head or fall available is very low, only a very short open flume will be necessary. If the head is a moderate height, or particularly if the head is high, it will be practically necessary to build a pressure conduit, though it is possible in some places to use an open canal. A pressure conduit may

be either a tunnel, a steel pipe, wood stave pipe with steel bands, or a reinforced concrete pipe.

The Power-House

At the end of the conduit are located the hydraulic turbines. There are two types of turbines in use to-day—the reaction turbine and the impulse wheel. The reaction turbine acts entirely under the pressure of the water. This type is used under low and moderate heads, and in recent years has been used for relatively high head installations. The other type, the impulse wheel, is used principally under high heads. It consists of a wheel with cup-shaped buckets on the rim, on which water from a nozzle strikes, turning the wheel around. In the same building and connected to the water-wheels will be the electrical generators. In all modern installations these generators are directly connected to the hydraulic turbines; that is, the shaft which turns the generator is connected with the shaft of the water-wheel. Therefore the generator runs at the same speed as the water-wheel or turbine.

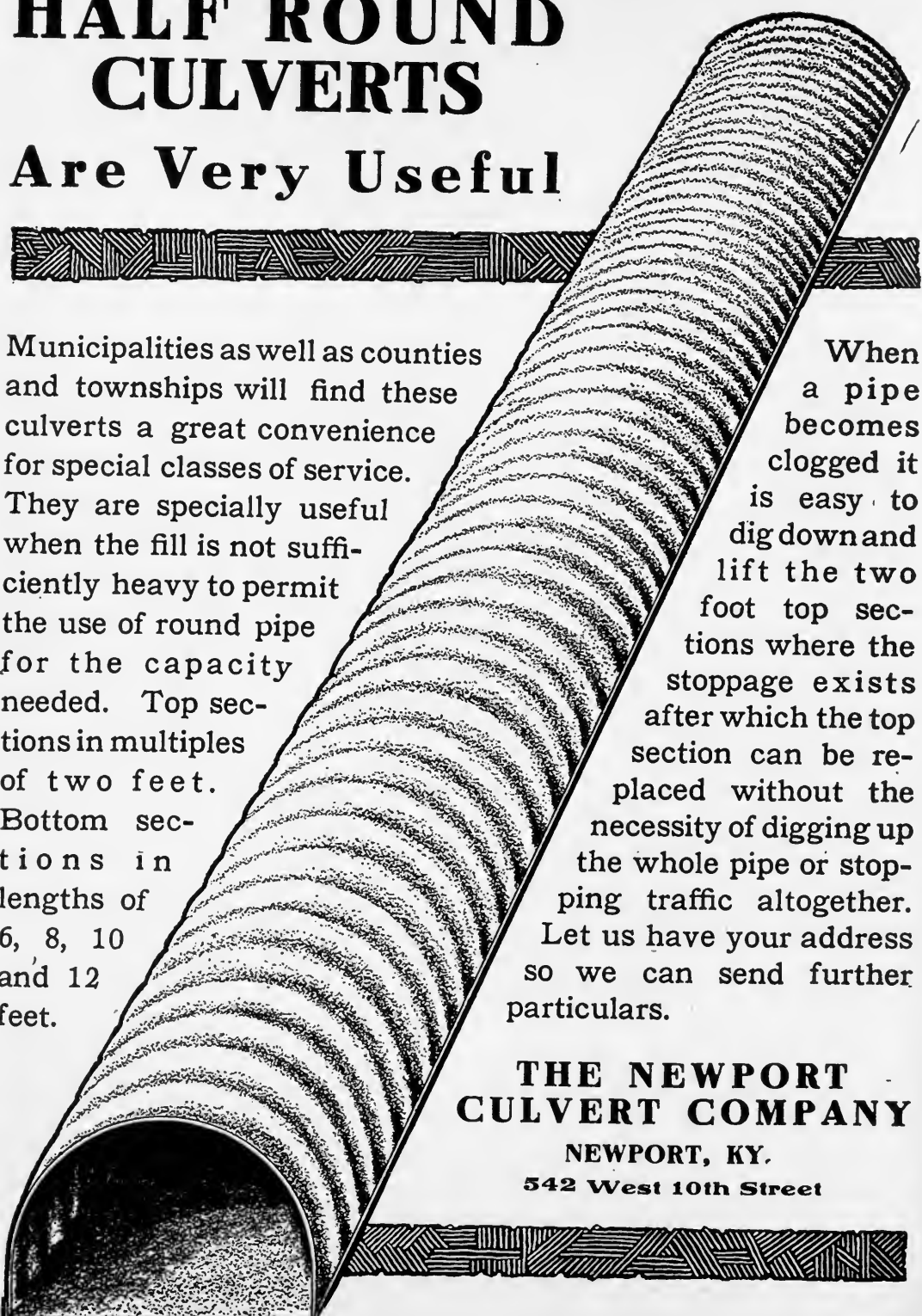
If the water-power is at some distance from the place where the electricity is to be used it will be necessary to increase the voltage so that it may be transmitted over high-tension transmission lines to the place where it will be used. In this case transformers are necessary.

Once those interested are satisfied that it is possible to develop water-power at a certain site, the very first step is to determine how much power can be economically developed and what the cost of the development will be. When an engineer is secured to determine these important matters he should be asked to state definitely in his report, first, the approximate amount of head that is available for power purposes; second, the amount of water which flows in the stream under average conditions and under extreme low conditions, with reasons for such estimates; third, the amount of power that can be developed under average conditions and under extreme low-water condi-

THE AMERICAN CITY

HALF ROUND CULVERTS

Are Very Useful



Municipalities as well as counties and townships will find these culverts a great convenience for special classes of service. They are specially useful when the fill is not sufficiently heavy to permit the use of round pipe for the capacity needed. Top sections in multiples of two feet. Bottom sections in lengths of 6, 8, 10 and 12 feet.

When a pipe becomes clogged it is easy to dig down and lift the two foot top sections where the stoppage exists after which the top section can be replaced without the necessity of digging up the whole pipe or stopping traffic altogether. Let us have your address so we can send further particulars.

**THE NEWPORT
CULVERT COMPANY**

NEWPORT, KY.

542 West 10th Street

tions; fourth, the cost of developing the power and transmitting it.

The two factors, the amount of power that can be developed, and the cost of developing the power, are the most important considerations in any proposed hydroelectric power development. It would seem as though this were self-evident, yet the failure to estimate reliably the amount of power that can be developed at a certain power site and what it would cost to develop it has resulted in many bitter disappointments. The first disappointment may come after the work is under construction. It may cost 50 per cent or 100 per cent more than was originally estimated. After the plant is in operation it may furnish sufficient power during the first year, and possibly for four or five years; then there may come a low year in which it is possible to develop only half of the amount of power for which the plant has been built. As a result, the water-power company or the municipality may be unable to supply its needs and may have to build a steam plant to take care of low-water conditions.

While there may be stream-flow records and records of rainfall, it is by no means a simple matter to determine how much power can be developed under average conditions and under extreme low conditions. The amount of power that can be developed can only be reliably estimated by a man expert in such matters.

It may be of interest to speak briefly of the two factors which must be considered in estimating the amount of power that can be developed on a stream. The first question to be considered is the head or fall that is available. By this is meant the difference in the level between the water back of the dam and the level of the water as it leaves the power-house. The amount of head is the natural fall in the stream between the dam and the power-house plus the height of the dam. If the amount of water flowing in a stream is constant, the amount of power that can be developed will vary in direct proportion to the head. That is, with a head of 200 feet twice as much power could be developed as with a head of 100 feet.

Having determined the amount of head available, the next step is to determine the

amount of water that is flowing in the stream under average conditions and under low-water conditions. The United States Geological Survey, in coöperation with the different state departments, has made measurements of streams all over the United States. While it has not measured every stream, most of the principal streams have been measured. These measurements vary in duration, some being for a period of a year, some for five years, some ten years, and very rarely twenty or thirty years. In most localities a record will not be available for more than five or ten years. Assuming that there is a record of five years in length, it will be necessary to compare this record of stream flow with the records of rainfall in the vicinity. Such records of stream flow are almost certain not to show the lowest water conditions that may occur, for there may be at some future time a year in which the flow of the stream will be much less than that shown in the record of five years' length. In case no records of stream flow are available, it will be necessary to estimate the flow of the stream based upon the records of adjacent streams. It is advisable to install immediately a gaging station on the stream as near as possible to the site of the proposed development. In connection with an investigation that the writer is making at the present time for a hydroelectric power plant, he has had a stream-gaging station established and also four rain-gages placed on the watershed, and this is for only a small stream, though the head is high.

After it has been decided how much power can be developed under average and extreme conditions of stream flow, an estimate of cost should be prepared by the engineer. The estimate should be prepared in such a way that it will be absolutely certain that the cost of the work will be less than the estimate.

When the engineer's report is once in the hands of those contemplating the development of the power, a decision must be made as to whether to proceed with the work. Once it has been decided to go ahead, the work will be carried out in the same manner as any other piece of modern construction work.



Tarvia-KP

FOR COLD PATCHING

Patrol maintenance crew patching with "Tarvia-KP."

Get Your Roads Ready Now for the Spring Traffic—



The hole to be patched is cleaned and the bottom and sides are painted with "Tarvia-KP."

WHEN the snow goes, look at your roads. Have they been scarred by winter? Are they pitted with small holes?

With the coming of Spring traffic, small, easily-filled holes may grow into expensive repair jobs, if they aren't patched in time.

"Tarvia-KP" is the perfect patching material for surface breaks and holes of any size in any type of hard-surface road.

It requires no heating

and is extremely easy to prepare, handle and apply. Freezing does not injure it.

"Tarvia-KP" patching material may be mixed at any time and stored until needed. It makes a smooth, even, perfectly bonded patch—a patch that becomes an integral part of the road itself.

There is only one "KP" and that is "Tarvia-KP" patching material made by The Barrett Company.

Our nearest office will gladly send you an illustrated manual of instructions showing each step in patching a road with "Tarvia-KP."



The mixture of "Tarvia-KP," tone and sand, is placed in the prepared hole.



The mixture is well tamped and covered with screenings.

New York
Detroit
Salt Lake City
Johnstown
Elizabeth
Chicago
New Orleans
Seattle
Lebanon
Buffalo
Philadelphia
Birmingham
Peoria
Youngstown
Baltimore
Boston
Kansas City
Atlanta
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Toronto
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Houston
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Cleveland
Nashville
Bangor
Latrobe
Jacksonville
St. John, N. B.

Pittsburgh
Syracuse
Washington
Bethlehem
Halifax, N. S.

THE BARRETT COMPANY, Limited;

Municipal Finance

BONDING

ACCOUNTING

TAXATION

The City Budget at a Glance

Two Methods of Presenting Financial Results

ANNUAL municipal reports should be something more than financial records and detailed evidences of the purposes for which public funds have been expended. A good report is one which every taxpayer and interested citizen can read with ease and understanding. It should give him a comprehensive view of the various purposes for which municipal funds are used and some idea as to the relative amounts spent for each purpose. These results are not obtainable from the ordinary many-paged annual report.

Fort Thomas, Ky.

Two methods of presenting municipal financial facts in an understandable and popular fashion are illustrated on pages 301 and 303. Fort Thomas, Ky., has prepared two budgets, one for the city at large and one for the school. As will be noted, a circle graph has been prepared showing the relative amount of money spent for each of the major items, and subdivided into the various purposes for which the money was spent. The graph serves not only to supplement the financial statement, which might be passed over by many readers, but also to give an idea of the relative amount of money spent for the different purposes, in a much clearer fashion than is possible by merely listing the sums of money. The circle graph would be more effective if the percentage or amount of money spent for each purpose were designated near the item.

A better way, perhaps, of presenting information of this sort would be by the use of a bar chart, which allows of a more ready presentation and comparison of the different items involved and overcomes the

difficulty of placing the names and amounts in the different subdivisions of the circle graph.

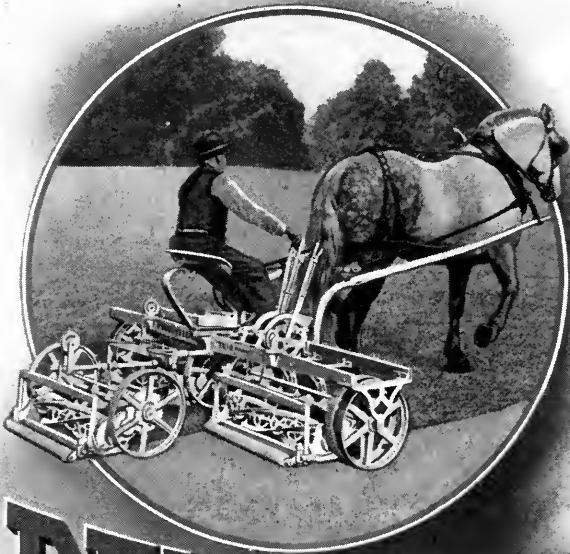
Watertown, N. Y.

Watertown, N. Y., has presented its 1921 budget in the form of a tabulated chart, which contains detailed information without excessive detail. While this chart does not catch the eye as readily as the graphic forms, it nevertheless offers a very satisfactory presentation to the interested taxpayer. The amounts spent for particular items, such as salaries, office expenses or new equipment, may be readily compared, since they are all in one column. The total amount spent for each activity is obtained from the two right-hand columns, while the total for each classification is given along the bottom.

The chart would be improved by the addition of two columns to the right, the one containing the grand total of the cost of each account, equaling the sum of the totals by receipts and by taxation, and the other a series of grand totals, giving the budget allowances for whole departments, such as general government, protection, health, etc. The ordinary citizen will be most interested, perhaps, in the list of accounts at the left, as they reveal the wide range of activities of the city government in a way which he may never have realized. These 5 by 8 charts are printed on the back of every tax bill, in the *Watertown Monthly Municipal Bulletin*, in the annual city report, and in the daily newspapers. They also serve as a sailing chart to the head of each municipal department, so that he may know exactly what may be spent for each classification in his various divisions.

THE AMERICAN CITY

"PENNSYLVANIA TRIO"



The "Pennsylvania Trio" is the culmination of the famous Pennsylvania Quality Line. It embodies all the exclusive quality features. No other mower will cut grass on golf courses, big estates or parks as efficiently, economically or speedily.

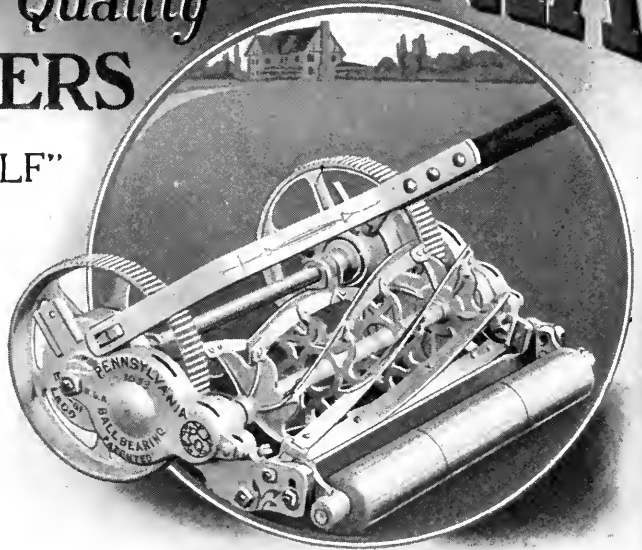
PENNSYLVANIA

Quality

LAWN MOWERS

"PENNSYLVANIA GOLF"

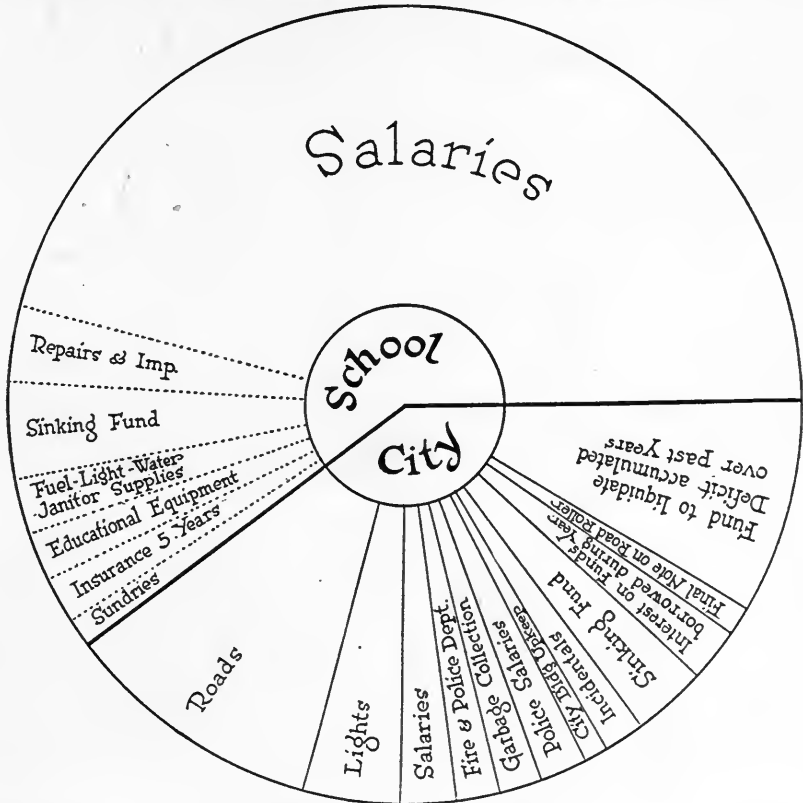
The "Pennsylvania Golf" has no rival when close cutting is required on tennis courts, putting-greens and lawns. It trims $\frac{3}{16}$ of an inch. All its blades are crucible tool steel; self-sharpening.



Write for "Pennsylvania Book"

PENNSYLVANIA LAWN MOWER WORKS, Inc.
1615 North 23rd Street, Philadelphia, Pa.

THE FORT THOMAS TAX PAYERS' DOLLAR



CITY
\$35,000.00

TOTAL TAX RECEIPTS
\$87,500.00

SCHOOL
\$52,500.00

CITY BUDGET

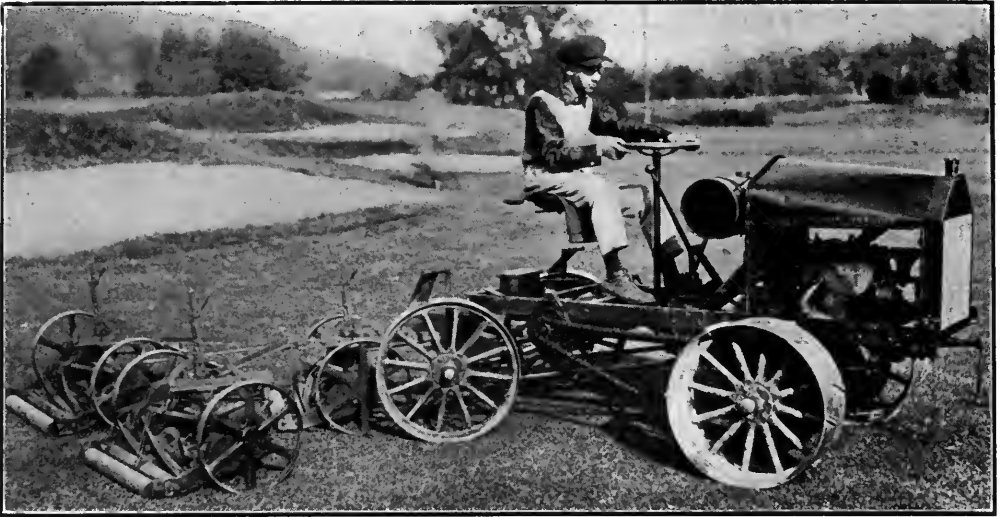
SCHOOL BUDGET

Deficit from Previous Years	\$13,800.00
Roads:	
Labor	2,300.00
Stone	3,500.00
Oil	2,500.00
Final Note on Roller	1,850.00
To County for Water Works and	
River Roads	1,000.00
Street Lights	3,725.00
Sinking Fund	2,500.00
Police Salaries	1,875.00
Garbage Collection	2,000.00
Fire-Police Department	1,175.00
Incidentals	1,000.00
Interest	1,500.00
Fireman	870.00
City Building	500.00
Salaries:	
Assessor, Clerk,	
Treasurer, City Engineer,	
City Attorney, Health Officer,	
Nurse (1)	2,185.00
	\$42,280.00
	35,000.00
Will Cut Deficit	\$ 7,280.00

Salaries	\$40,910.00
Repairs and Improvements	2,750.00
Fuel, Light, Water, Janitor, Supplies ..	2,300.00
Educational Equipment	2,000.00
Five Years' Insurance	1,500.00
Sundries	750.00
New Addition to Central School ..	3,683.75
Sinking Fund	5,000.00
	\$58,893.75
Received from State	6,393.75
Received from City	52,500.00

ISSUED BY THE CITY COUNCIL

Reprinted by courtesy of Mayor W. H. D. Wheat



THE WORTHINGTON TRACTOR AND SHAWNEE MOWER

The Shawnee Triple Mower has become the main dependence for parks, golf fairways and lawns of large estates throughout the country.

It is drawn easily by one horse.

In combination with the Worthington Tractor it will mow four times as much lawn area as any other mowing apparatus in the world.

The Tractor is especially designed for lawn service. It improves the turf and does not mar or injure the surface. It has patented features which have given it immediate preeminence.

It displaces the horse and reduces the cost of the mowing operation one-half.

The gang mower alone and in combination with a tractor is broadly covered by patents owned by this company.

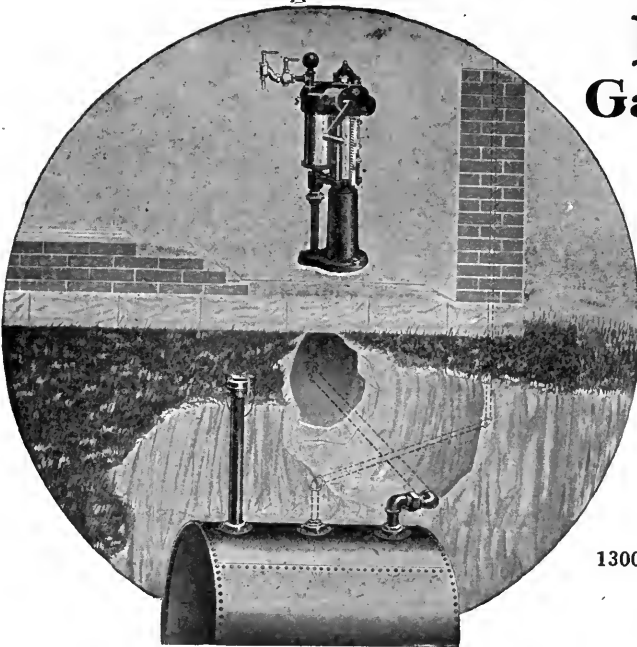
WORTHINGTON MOWER COMPANY
Shawnee-on-Delaware, Pa.

CITY OF WATERTOWN BUDGET FOR 1921

In accordance with schedule of state controller, for uniform system of accounts in cities of New York State

		SALARIES CLERKS WAGES TRAVELING EXPENSES OFFICE EXPENSES PRINTING AND ADL. NEW EQUIPMENT MAINTENANCE OF EQUIPMENT MATERIALS AND SUPPLIES REPAIRS LIGHT, HEAT AND POWER RENT INSURANCE OTHER EXPENSES BY RECEIPTS BY PAYMENT													TOTALS
NO.	ACCOUNTS	A	B	C	D	E	F	G	H	I	J	K	M	TOTALS	
101	COUNCIL	3000			200	1500								300	5000
102	MAYOR	750												300	1050
103	CITY MANAGER	7500	600		200	200								100	8600
106	PURCHG AGT	2000				50	50								2100
107	CITY AUDITOR	2500	500			100	200	50						50	3400
108	CITY TREASR	2400	1650			250	325								4650
110	CITY CLERK	1650	500			100	50		50						2350
111	ASSESSORS	3240	500			110	450								10300
112	CITY ATTORNEY	3000	300		200	66		234					6000		3800
113	CIVIL SERVICE	300				50	50								400
114	PUBLIC WORKS	8420	1650			300								300	10670
116	CITY ENG OFF	12764	600	1000		536		800	200	100				300	16300
117	ELECTION	1700		105			50	400		125		820		25	9225
118	CITY COURT	3100	1800			250	50								5200
119	MUNICIPAL BLDG		900	1200		546			200	1800	2254	1000		100	8000
120	CONSTABLE FEES	300													300
121	COMPENSATION													2000	2000
130	POLICE DEPT	40776			500	250	150	300	600	250	250			500	43576
132	FIRE DEPT	70903			200	195		15604	5045	4885	3250	552		966	101600
134	BLDG INSPECTR	2400		520		85	650							345	4000
135	PLUMBING	195					55								250
136	PLUMBING INSPECTR	1800				25	300							275	2400
137	WEIGHTS AND MEASURES	1800				60			50					240	2150
150	HEALTH ADMINISTRATION	6600				120	90	100		35				1855	8800
151	MILK AND MEAT INSPECTION	2700		80		30	20	500		45				425	3800
152	IDEA WEE HOSPITAL	2000			60	30		100		600	400	60		50	3300
154	DENTAL DISPENSARY	1650		100					200		50				2000
155	CHILD WELFARE													1000	1000
156	CREMATORY	720				39			20					171	950
160	BUREAU SEWERS		2150				1800		2250						6800
161	STREET CLEANING		23225						275						23500
162	REFUSE AND GARBAGE	5600		1500											7100
181	HIGHWAY MAINTENANCE		24000				6800		7000	9200	49000				96000
182	SNOW AND ICE REMOVAL		5600						1400						7000
184	SIDE WALKS	1500		750					750						3000
185	STREET OILING		3750						11250						15000
190	SUPT CHARITIES	2250			120	80								50	2500
191	OUTDOOR POOL RELIEF								13000						13000
192	INSTITUTIONAL RELIEF													20000	20000
196	PROB OFFICER	1000													1000
197	BUREAU OF CHARITIES													500	500
210	SCHOOLS	254390	2480	25400	1000	460	1600	10400	39200	25500	4000	2000	16800	89800	256840
218	LIBRARY	3880	1200	785		630		1955	1320		230				10000
230	CITY PARK	1800		6030	155		385	270	580	2130	540	110			12000
231	PLAY GROUND	1900		200			300	200	300	300			100		3300
232	SWIMMING POOLS	400		200				100							700
233	BAND AND CONCERTS													500	500
234	MEMORIAL DAY													400	400
235	SKATING RINKS		500												500
236	BOGGS SLIDE						500								500
260	SETTLEMENTS & SOCIAL WELFARE													1500	1500
266	CITY BULLETIN					300									300
270	OF DEBT													14000	14000
272	INTEREST ON FUNDS													48013	48013
273	INTEREST ON TELEGRAPHY													3499	3499
274	DEBT													127272	127272
300	WATER ADMN	4500	3700	4060	500	1200	450	100				150	200	14860	
301	OPERATION	4500		2800	366	50	5750		200	645				6085	20396
303	PURIFICATION	3000		8378	181		60	150	23975	4000	5567			800	46111
304	PUMPING	2000		5656	131				1150	500	2193				11630
305	DISTRIBUTION			8492			4881	6850		790					21003
306	WATER DEBT														(23788)

TOTALS BY CLASSIFICATION: 476888 16380 127081 2906595 6390485 41645 11081049209 631929302150278809 2275889 1895
 Does not include State and County Tax for 1921, not levied yet, but was 191,087 in 1920. ★ As sub-divided, requested
 Does not include \$160,000 estimated general receipts. ★ As sub-divided, requested



BOWSER ESTABLISHED 1885 **Gasoline and Oil Storage is Safe**

The air-tight and all metal construction of Bowser oil and gasoline measuring pumps and tanks eliminates danger from fire and explosion.

Not once in 35 years has a Bowser caused a fire or explosion.

Write for our Illustrated Booklet No. A-00.

S. F. BOWSER & CO., Inc.

1300 Creighton Ave., Fort Wayne, Ind.

S. F. Bowser Co., Ltd., Toronto
S. F. Bowser & Co., of Dallas, Texas

Branch offices in principal cities of the world

A Financial Service For the Municipality

We are prepared to inform municipal officials regarding

1. Present cost of raising money
2. The most desirable method of financing

Our municipal department handles state, county and municipal bonds representing over thirty states in the union. Our experience and facilities are at the disposal of any municipality.

Correspondence invited

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Investment Securities

62 Cedar Street, New York

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Minneapolis

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Cleveland

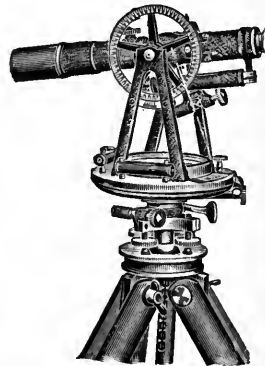
If You

are contemplating the purchase of a TRANSIT why not make it a "KOLESCH,"—and *know* you will be satisfied?

Kolesch Surveying Instruments

are built to meet the especial needs of Municipal Engineers, Transit No. 7710 shown is particularly well suited for road, street and sewer work.

Send for latest catalog



KOLESCH & CO., 138 Fulton St., New York

News and Ideas for Commercial and Civic Organizations

Memphis Claims Continuous Membership Solicitation Record

MEMPHIS, TENN.—The records for continuous membership work are believed to have been smashed in Memphis just before Christmas when the Membership Division of the Chamber of Commerce reported a total of 424 new members for the last quarter of 1920. Ninety-three of the recruits were reported for the last week of the quarter. This brought the entire membership up to 5,010.

The meeting during that last week marked the end of what might be called the experimental stage of the division's work, with its zone plan of continuous solicitation. In the fall the Chamber had a membership committee of 25, and the majority of the work of securing new members was done by personal solicitation on the part of the membership secretary. The Board of Directors decided to expand the committee into a division and increase its number to 200.

The division having been created, its executive committee proceeded to divide the city into twenty zones, with a team assigned to each zone. Each of the teams was headed by a chairman, who directed the work of his organization under the supervision of the division chairman and the executive committee.

The Chamber's officials are highly pleased with the work of the division during its experimental stage, and expect even greater things of it during this year.

It should be stated, however, that the Memphis Chamber of Commerce experienced its greatest proportionate expansion in 1916, when, as a result of the reorganization campaign conducted by the American City Bureau, the membership was increased from 1,350 to 2,673. The experience gained in this campaign and subsequent war drives was employed to advantage during the continuous solicitation period.

J. A. OSOINACH,

Assistant Secretary, Memphis Chamber of Commerce.

Dead Trees Given to Wood-choppers for Firewood

WATERBURY, CONN.—Waterbury has gotten rid of about 500 dead chestnut trees as the result of a recent activity of the Rotary Club, which conceived the idea of offering them to the citizens for firewood if they would chop them down and carry them away. The chestnut trees were struck by the blight which swept the country a few years ago, and began to die at a time when labor was scarce and therefore expensive. They had become eyesores to the members of the Rotary Club, and the present period of unemployment, with the scarcity of coal and money, seemed an especially appropriate time to have them removed. Even wood is costing \$14 and \$15 a cord.

The suggestion was made at one of the meetings of the Rotary Club that the trees be offered for fuel to those who wished to cut them down. Permission was to be obtained from the property owners and the trees assigned in a systematic manner to those who applied for them. Several hundred yellow cards measuring 10 by 14 inches were printed, reading:

P E R M I S S I O N
will be given to cut down this
tree No. for firewood.
Only those trees marked with this
card may be cut. Any one who
desires this tree should write to
ROTARY CLUB WOOD COMMITTEE,
Waterbury, Conn.

Notices were then inserted in the newspapers telling those who desired trees to meet the committee at a certain hour. At the appointed time, the committeemen appeared, armed with yellow placards. Wood-choppers soon were swarming around the spot. From one to five trees were given to each applicant, who took his numbered cards and tacked them to the trees of his choice.

All sorts and conditions of people applied for the trees. Some had money for coal and could not get it; others had need for

THE AMERICAN CITY

The Best Way to Bind Roads and Prevent Dust

THE adhesive properties of Dow Calcium Chloride Flake are so well known as to require little explanation to state highway departments. But there are road makers and park and cemetery superintendents not yet familiar with the effectiveness and economy of Calcium Chloride as a dust preventive and road binder.

Roads are destroyed by continual loss of material, pulled away by rapidly moving wheels or blown away as dust. Dow Calcium Chloride Flake holds these fine materials firmly bound to the road. The flake form permits easy distribution.

Dow Calcium Chloride Flake prevents dust because it is a natural absorbent, taking and holding sufficient moisture from the air to keep roads in moist, dustless condition.

The application of Dow Flake Calcium Chloride to gravel or macadam road or driveway is simple and inexpensive. It is pronounced by expert road makers as the most economical and efficient dust preventive on the market at the present time.

Write for full information today if connected with building or maintenance of gravel and macadam highways in country, city or park.

The background of this advertisement shows exact size and form of Dow Calcium Chloride Flake.

THE DOW CHEMICAL COMPANY
Midland, Mich.



coal but no money. Some carried their trees home on their backs; others cut them in lengths and piled them in wheelbarrows; others hired wagons. In three months all the dead trees, which had formerly only cluttered up the city and spoiled the landscape, had been felled, and the community was benefited in many ways from the activity.

GEORGE W. GREENE,
Secretary, Waterbury Rotary
Club.

Fire Insurance Rate Reduced

DALLAS, TEX. — The city of Dallas received a welcome New Year's present in the form of a reduction in the fire insurance key rate from 16 cents to 12 cents, which became effective on January 1. In order to secure this lower rate, however, a vigorous fire prevention campaign was conducted, as a result of which the city is now freer from fire hazards, which is the real cause for thanksgiving. Another factor which lessens the danger of conflagration is the complete motorization of the fire department, which took place last year.

The reduction in the fire insurance rate came after many months of effort on the part of the city administration, the Chamber of Commerce and other bodies. In the city of Dallas itself the new rate means a saving of 4 per cent on mercantile buildings and their contents, and in the suburb of Oak Cliff 7 per cent. Dallas now has the lowest fire insurance key rate of any of the larger cities of Texas.

Z. E. BLACK,
Director of Publicity, Chamber of Commerce &
Manufacturers' Association.

Fire Prevention Campaign in Ironwood

IRONWOOD, MICH.—As a part of the fire prevention campaign recently conducted in Ironwood, the exhibit illustrated herewith was held. It was very instructive, and aided greatly in driving home the lessons which the campaign was intended to teach. It taught, for instance, the proper use of



FIRE PREVENTION EXHIBIT OF THE IRONWOOD, MICH.,
CHAMBER OF COMMERCE

and schools, as well as the use of hand fire extinguishers. Advice was also given on the right way to send in a fire alarm; 500 took advantage of the offer of such instruction. The auxiliary boxes and the fire alarm boxes used in the exhibit were furnished by the Gamewell Fire Alarm Telegraph Company.

Eight hundred cards containing the numbers and locations of the fire alarm boxes in the city were given out, also a large quantity of literature on the hazards created by electrical devices, and pamphlets on "Stop Burning Up Homes."

Talks on fire prevention were made in the schools, and fire drills were held in them. The results of the latter are most encouraging. Two weeks afterward a parochial school of 444 children, with no previous warning, left the building in 55 seconds after the alarm had been given, and were all back in their places, marching to the music of a piano, in less than five minutes altogether. The Central School children, over 900 in number, were out of the building in one minute and a half. The Lanfer School, with 823 children, were out in a minute and a quarter.

The good results of the campaign were made possible by the work of a joint committee of the city officials and the Chamber of Commerce, which coöperated with the Fire Chief in his desire to make it a signal success.



STANDARD TREE BANDS

PROTECTS TREES AND LARGE SHRUBBERY AGAINST ALL CLIMBING WORMS, CATERPILLARS, MOTHS AND INSECTS.

LASTS A SEASON—FULLY GUARANTEED.

Made of heavy waterproof paper, with a sticky material under the umbrella-like canopy. This canopy protects the "gum stickum" from the weather, as well as from dirt, dust and falling leaves.

No climbing caterpillar or insect can pass this sticky material. It catches them and holds them if they set foot upon it.

Attached to the band, on the inside, is a strip of fluffy felt. This felt fills up the depressions in the bark and prevents passage under the band. No cutting away of bark is necessary. The felt fills it up.

Guaranteed to be effective for the season, in all weathers and all temperatures in which worms or insects are active (about 40° Fahr. to highest summer heat).

Put up in rolls, 25 and 100 foot lengths, flat when boxed, mushrooms when tacked on tree.

Easily applied. Simply cut length to encircle tree. Tack, then raise the outer band until it stands out like an umbrella. It will mushroom as shown in cut and so remain. It only takes a moment.

Cheaper and better than the usual sticky materials applied direct to bark. Positively cannot injure tree. Bark colored and not unsightly. Can be taken down and discarded at end of season.

The most effective and practical method of banding trees yet devised—also the cheapest. Has the endorsement of foresters and fruit growers everywhere.



A powerful, highly concentrated and soluble plant food for flowers, house plants, shrubbery, trees, gardens, truck lands and lawns.

Promotes luxurious growth; increases the yield; imparts a deep green color to foliage and brilliancy to flowers.

The most highly concentrated and properly balanced fertilizer ever compounded.

Many times the strength of ordinary fertilizers. Never before has such a high analysis been attained.

A pinch will intensely fertilize a house plant, a one-pound package 200 square feet.

Standard Flower and Garden Fertilizer will revive those puny, pale, sickly plants, flowers, trees, shrubs, etc. A trial will convince.

ANALYSIS

Nitrogen 15 to 17 per cent
Equiv. Ammonia . . . 18 to 20 per cent
Avail. Phos. Acid . . . 10 to 12 per cent
Potash (K2O) 8 to 10 per cent

Odorless

Put up in 1 and 5 lb. Boxes and 25 lb. Bags.

Extensively used in parks, cemeteries and public grounds.

Write for samples and prices.

THE EGGERT CHEMICAL CO.,

Canton, Ohio

AGENTS WANTED EVERYWHERE

WRITE FOR PROPOSITION

Alexandria Hangs Out the Latch-string

ALEXANDRIA, LA.—Alexandria is flashing a warm welcome to visitors to the city by means of a huge electric sign which has been stretched across Jackson Street at the Union Depot. The sign, which is 30 feet long and 12 feet wide, carries the legend, "Alexandria, in the Heart of Louisiana," in letters two feet high. There is a heart in the sign which is four feet across and is illuminated with red incandescent globes.

The money for the sign, which was erected on December 1, was raised by the Chamber of Commerce by means of a street carnival in which none but local talent was used. The carnival was a great financial success.

To emphasize the welcome, a train shed is to be constructed over the passenger tracks at this depot, to make it possible for passengers to go from the depot to taxicabs in comfort when the weather is bad. When the depot was built, about ten years ago, through either oversight or lack of funds the Railway Company neglected to project a covering over the tracks from the depot proper, and the traveling public has experienced a great deal of inconvenience in getting on and off trains in inclement weather. Pressure was brought to bear upon the Texas and Pacific Railway, which owns the depot, by the Chamber of Commerce, with the result that the train shed has been included in the Railway's program of improvements for 1921, no money having been available for it in 1920.

A. T. FELT,

General Secretary, Alexandria Chamber of Commerce.

Merchants in Coöperative Advertising Campaign

BLUEFIELD, W. VA.—Coöperation among the merchants of Bluefield has been brought about in an interesting manner by the Chamber of Commerce, through its Merchants' Bureau. A year or more ago few of these merchants could be either cajoled or threatened into a coöperative frame of mind. They were sufficiently prosperous at that time, and were like the Irishman who said he could not fix his roof when the weather was bad, and when the weather was good it wasn't necessary. To-day, however, those merchants act and think as a unit. The change was not brought about by financial inclemency, either. Bluefield is still prosperous. The cementing force was

an idea that appealed to the retailers, and one that worked splendidly.

Fifty of the retailers were induced to attend a supper meeting called by the Merchants' Bureau. At this meeting it was explained to them that Bluefield is the natural commercial center for a population of about 350,000 people living in adjacent counties of the great coal mining section of West Virginia; that most of these people are miners, or connected with the mining industry, and have more money than they know what to do with at present because of the large wages they have been receiving of late. The idea, the diners were told, was to create a channel through which this money would flow into Bluefield in exchange for the goods Bluefield merchants had to sell.

To accomplish that purpose a program of coöperative advertising was forthwith determined upon, and subscriptions to an advertising fund of \$1,500 were called for. In thirty minutes \$3,500 was contributed, and the following day the amount was increased to \$5,000. "When that money is used up," they said, "just call again."

Thousands of letters were sent into the coal fields, and many pages of newspaper advertising were used to show the public that both better service and a better selection were obtainable in Bluefield than in the smaller mining centers. The dealers in the various specialty lines clubbed together in an effort to sell their commodities to the rural population. Local citizens were urged to trade at home; arguments were presented to them to show that they could do as well in Bluefield as elsewhere.

Monthly sales days, at which each merchant sold some article at absolute cost, were inaugurated. These sales days are now regarded as a public institution, and are anticipated with interest by both the merchants and the public. The streets are always lined with people, many of whom never traded in Bluefield before, but who now come from points 60 and 70 miles distant.

In order to ascertain the actual results of this activity, the Merchants' Bureau asked the banks for the amounts of the total deposits made by the merchants on the first of those days and the amounts deposited on the best day previously enjoyed by them. The comparison showed that the deposits on that day were twice as much as they had ever

THE OTTERSON AUTO-EDUCTOR CLEANS CATCH BASINS Saves Time—Money—Labor



Mounted on any 5-TON Chassis of suitable standard make.

THE OTTERSON AUTO-EDUCTOR CO.

SPRINGFIELD, OH



Eureka Snow Plow

Horse Drawn Tractor Driven

Will mount curbs with ease and remove 24 inches of snow in one trip. The wings are adjustable to any width and either wing may be detached. One user writes regarding use with tractors, "The plow is so simple and the method of attaching so easy that these facts coupled with the reasonable price should make a strong appeal to all tractor owners interested in snow removal."

THE W. M. TOY COMPANY
Sidney Ohio



No matter WHAT drinking fountain you may put
INDOORS

← This
The MURDOCK
PATENTED

↗ **ANTI-FREEZING** ↖
BUBBLE-FONT

IS THE ONLY ONE THAT IS SAFE
TO INSTAL OUTDOORS BECAUSE

it is the only drinking fountain made that was designed and is built solely for outdoor use. It does not have to be turned off at the approach of cold weather.

THE ONLY FOUNTAIN MADE THAT IS STRONG ENOUGH TO WITHSTAND PUBLIC ABUSE.

Write for fully illustrated literature to
The MURDOCK MFG. & SUPPLY CO.

**FIRE HYDRANTS
YARD HYDRANTS
HOSE BOXES**

CINCINNATI, - - - - OHIO
Builders of Water Service devices since 1853

been before. And the merchants declare that not more than 40 per cent of their business on those occasions is done on the special bargain that has been advertised, although it doubtless brings the crowd to the city.

These conspicuous results have shown the merchants the value of coöperative advertising, and they are now receptive to suggestions for coöperation along other lines.

CARROLL R. WOODS,
Secretary-Manager, Bluefield Chamber of Commerce.

Leavenworth's Auditorium and Sales Pavilion

LEAVENWORTH, KANS.—The farmers and stock breeders of Leavenworth County now have a fine large auditorium and sales pavilion in which their various interests may be taken care of. The Chamber of Commerce, with the Farm Bureau coöperating, organized the Leavenworth County Auditorium and Sales Pavilion Association to finance the enterprise. Approximately 25 per cent of the stock was taken by the farmers and stock breeders, and the balance by local business men.

The building is a one-story structure, of truss roof construction, and measures 96 by 125 feet. It has a concrete floor 7 inches thick throughout. The walls are of hollow tile, plastered on the outside with Portland cement and stuccoed. There are four large double doors, and the main entrance is a smaller double door. The large doors accommodate a motor truck conveniently.

Besides the large auditorium, the building is equipped with offices, and rest rooms for men and women. At the time of submitting this article, three large public meetings had been held, also a county fair, a poultry show and a corn exhibit. There have also been held in the pavilion a pure-bred Holstein dairy cattle sale, a pure-bred Shorthorn beef cattle sale, two grade cattle sales, and a community sale, in which a considerable quantity of household goods and farm equipment was sold.

The project was undertaken with the

idea of securing a combined convention hall and sales pavilion, and the building has met all expectations in that regard. The acoustic properties are excellent and the building is very comfortable for the holding of meetings. When used for exhibiting or sales purposes it will accommodate nearly 200 cattle at one time, and can be cleaned so easily and thoroughly that it is quite possible to follow a cattle sale with a public meeting.

The Association is managed by a board of seven directors, three of whom are farmers and live stock men and four are business men and bankers. The General Manager is President of the Leavenworth County Farm Bureau.

There has been the most complete harmony between the farmers' organizations and the Chamber of Commerce throughout the entire conduct of this undertaking. Leavenworth is the center of one of the richest agricultural districts in the



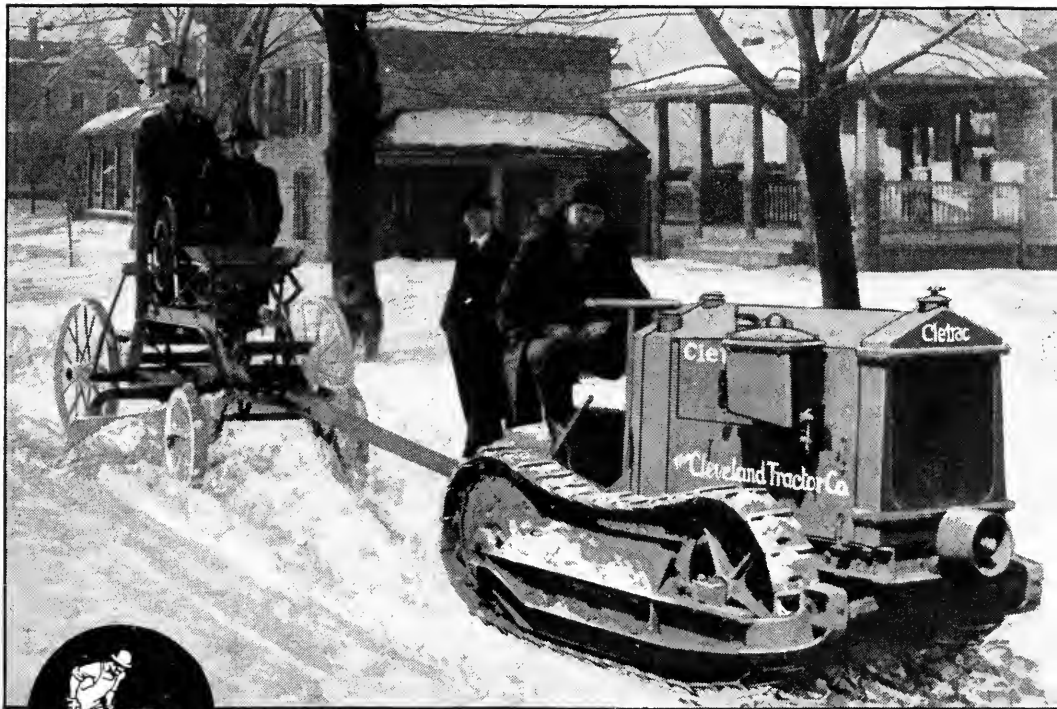
AUDITORIUM AND SALES PAVILION PROVIDED FOR THE FARMERS BY THE LEAVENWORTH, KANS., CHAMBER OF COMMERCE

country, in which general farming was the chief industry up to within the last three years. The efforts of the Farm Bureau, however, with the assistance of the Chamber of Commerce, have brought the county to the front as a dairy county, and the auditorium and sales pavilion was conceived of as a means of improving the condition of the stock breeders of the county.

E. Y. BLUM,
Secretary-Manager, Leavenworth Chamber of Commerce.

Cleveland Votes Higher Taxes to Save Money

CLEVELAND, OHIO.—Selling higher taxes to a tax-weary city sounds anything but easy, yet the Cleveland Advertising Club



HARD THIS WAY
BUT—

EASY ON A TRACK
THE CLETRAC WAY



SPECIFICATIONS

Horsepower: 12 at drawbar, 20 at belt-pulley

Length: 96 inches

Width: 50 inches

Height: 52 inches

Weight: 3420 pounds

Turning Circle: 12 feet

Traction Surface: About 800 square inches

Center to Center of Tracks: 38 inches

Belt Pulley:

Diameter 8 inches, face 6 inches

Use Cletrac for Winter Road Work

THE all-purpose Cletrac is just as valuable on road work in winter as in summer. It works over icy footing and goes right through the deepest snow—keeps the roads clear with scraper or snowplow.

Cletrac has abundant power and that certain traction so essential in heavy winter hauling. Its broad, sharp-cleated tracks get a firm, *bull-dog* grip on all kinds of footing.

Cletrac is ruggedly built—it “stands the gaff” under the toughest of working conditions.

Investigate this tractor—then put it to work preventing winter traffic tie-ups in your town.

We'll gladly send you more detailed information. See the Cletrac dealer near you.

Cletrac
TANK-TYPE
TRACTOR

THE CLEVELAND TRACTOR CO.

“Largest Producers of Tank-Type Tractors in the World”

19205 Euclid Ave.

Cleveland, Ohio

recently turned the trick. The story of how a special committee of the Club successfully conducted a campaign in behalf of five tax levy proposals contains suggestions which may save the day for organizations struggling with the tax problem. The five measures were carried by a vote of almost 3 to 1.

Cleveland was in financial straits, caused by steadily rising operating costs and a stationary income, and the city's tremendous growth of recent years, which, with the rigid Ohio tax laws limiting the tax to only one per cent of the assessed valuation of the realty, rendered it increasingly difficult for the city fathers to meet their obligations. The Board of Education had been limping along for some time with inadequate equipment, and faced the probability of being obliged to discharge 1,800 teachers within a year, and cutting down its curriculum considerably, unless the deficit were cared for. And there were appalling deficits in other departments of the city's work, especially fire; police; street cleaning, repairing and lighting; health; parks, playgrounds and public baths; the city hospital and infirmary, and the tuberculosis hospital.

The special committee appointed by the Cleveland Advertising Club made a careful study of the situation, and, with the assistance of the Bureau of Municipal Research of Cleveland, prepared 250,000 pamphlets containing facts and figures on every conceivable phase of the proposed five tax measures. It was pointed out in the pamphlet that unless the Clevelanders voted "yes" five times on election day, the city would not be safe, healthful, clean, prosperous, nor beautiful, and that it would lose half the educational service then rendered by the public schools.

Gardner Law Affords Relief

The case was not a hopeless one, however, because, to quote from the pamphlet:

"Fortunately the state legislature has realized the plight of Ohio cities and passed a relief measure. This is the 'Gardner Law.' It provides that interest and sinking fund charges on all city bonds issued before Jan. 20, 1920, may be met by a tax levy outside all existing tax limitations providing the people vote to do so.

"At present tax limits have been reached. The city cannot have a higher tax levy for operating purposes as things stand now. But if the voters place interest and sinking fund charges outside the present limit, leeway for

securing additional revenue for operating purposes will be created within the existing tax limits.

"But to make the Gardner law effective as a relief measure, the voter must pass favorably upon two separate questions:

"1. To exempt the rate of 3.1 mills for interest and sinking fund charges from all existing tax limitations.

"2. To levy additional taxes for operating purposes of the city not to exceed 3.5 mills.

"The levy of 3.5 mills for operating purposes will not actually increase taxes. It will merely allow the city to secure additional revenue for operating purposes by taking advantage of the leeway within present tax limits created by exempting the interest and sinking rate from these limits.

"The placing of the interest and sinking fund rate of 3.1 mills outside present tax limits does increase the total tax rate by that amount. But in the truest sense it will be a move to reduce taxes. This is true because it will make operation of the city on a pay-as-you-go plan possible. And this is the only sound policy to follow. To continue borrowing money for operating the government can only result in higher and higher taxes with less and less to show for them. The legitimate demands of Cleveland upon the taxpayers in future will be sufficient. Why increase them unnecessarily?"

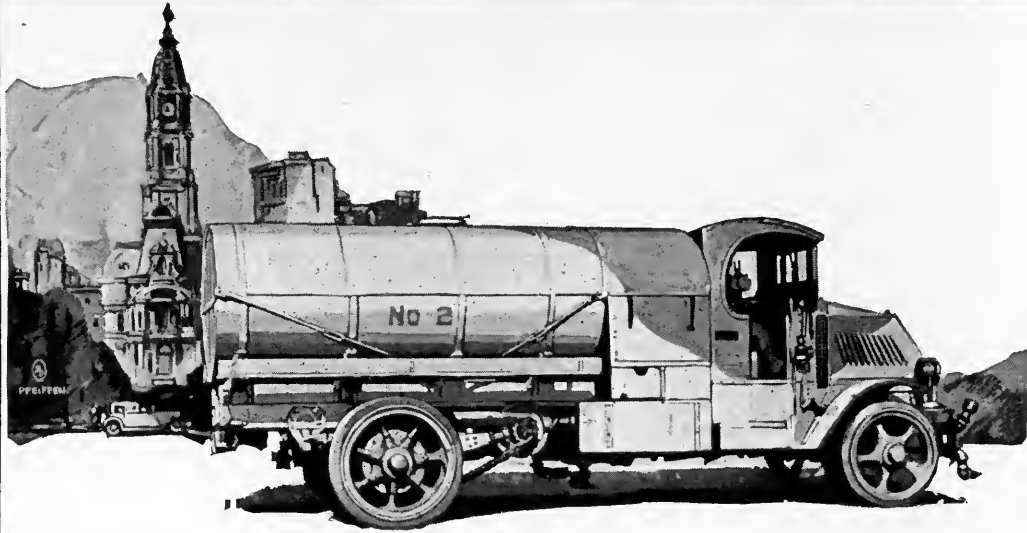
Winning Over the Public

The pamphlet, which was called a "campaign primer," gave figures to prove that the measures proposed would cost only \$5.05 more per \$1,000 assessed valuation than the property owners were then paying, but would make possible the "pay-as-you-go" plan.

The story was also told in a series of 16 half-page and full-page advertisements which were run in 25 publications, including 13 foreign language newspapers. A one-reel motion picture, filmed especially for the campaign, entitled "Which Shall It Be?" was shown for twelve nights in picture theaters, schools, community centers and in the Public Square. Single and two-sheet "Save Cleveland" posters were put up in conspicuous places, and painted billboards carried the message to passers-by. Garbage wagons bore signs indicating that failure to vote "yes" on the five proposals on election day meant practical cessation of garbage collection.

Every public school was furnished with a banner for its entrance urging the public to keep the schools open. The children themselves helped out by drawing posters and staging demonstrations in behalf of "Save Our Schools."

THE AMERICAN CITY



The Two-Engine Mack Flusher

Both engines installed in the Mack two engine street flushing apparatus are designed and built by the same manufacturer—the International Motor Company. The service and economic advantage of this combination will be fully appreciated by those using the equipment.

As a result of the simplicity of Mack design, in both chassis and motors, and the high quality of materials and workmanship inherent in all Mack products, this par-

ticular two engine unit at lower final cost will give more service than other similar types.

The two-engine Mack flusher is especially adapted to high speed flushing, an important factor. Each engine has an abundance of reserve power and ample pressure is available for all requirements. Our engineering department will be glad to give further details concerning its advantages, specifications, etc.



INTERNATIONAL MOTOR COMPANY
New York



"PERFORMANCE COUNTS"

Special features abounded. A train of flat cars bearing signs urging support of the levies was run over Cleveland's street railway system for several days. "Mose" Cleveland, in tattered garb, stood at street corners distributing literature telling about his sad financial plight. Speakers were sent to address special meetings, and the co-operation of the pulpit was secured.

The voting of these tax levies at a time when the community was already overburdened was a source of great satisfaction to the 23 club members delegated to see the proposition through.

DONALD C. DOUGHERTY,
In charge of Publicity, Cleveland Advertising Club.

"Resume Buying" Campaign Helps to Stabilize Business

KANKAKEE, ILL.—To keep business alive, a campaign to get the people to resume buying was conducted in Kankakee recently by the Chamber of Commerce. The Retail Merchants' Committee of the Chamber called a meeting of the Kankakee merchants for the purpose of discussing the situation which has arisen as a result of the buying strike, and determining upon a course of action. At this meeting the fact was clearly brought out that the farmers, the laboring men and the buying public in general were purchasing nothing that they could get along without because they were looking for still lower prices, not realizing that by continuing the strike on buying they had produced a condition which could be remedied only by a resumption of the practice of buying somewhat more than the actual necessities of life, and that their refraining from doing so was paralyzing industry.

As a result of this meeting, immense posters bearing the words "Buy What You Need Now," and "Your Purchases Keep Kankakee Industries Alive," were distributed simultaneously at all the stores and posted on billboards. The next morning the



TWO OF THE PLACARDED CARS THAT WERE RUN THROUGH CLEVELAND'S STREETS

citizens were everywhere greeted by these significant appeals.

The newspapers carried advertisements covering an entire page setting forth the merchants' willingness to take their losses, along with everybody else, and their readiness to aid in bringing about normal conditions as soon as possible, but called attention to the fact that if the local industries were to be kept running, the men employed in them must keep on buying, and thus make it possible for the merchants to place orders with the industries; or, in other words, if the purchasing stopped, the merchant could not give any business to the jobber, nor the jobber to the industry. Without business, the industry would be obliged to close its doors and the workers would be thrown out of employment.

Several columns of these page advertisements were devoted to a comparison of the current prices of groceries, dry goods, shoes, etc., with those of several months ago. These comparisons showed a substantial reduction, and enabled the merchants to point out to the workers that their acceptance of lower wages made it possible for them to turn around and get a reduction in the cost of the things most essential to their existence.

Everyone feels that the campaign did much to enlighten the public mind in these matters and helped to eliminate misunderstandings.

E. A. WARNER,
Manager, Kankakee Chamber of Commerce.

Street and Road Building by Tractor

QUICKER—CHEAPER

Below is illustrated a Best Tracklayer "Thirty" hauling a road leveler. In putting through new streets and roads, in the maintenance of established highways, Best Tracklayer Tractors furnish the power needed to shove through the work without delays and at less cost than with animals.

Flexible, compact, easily managed, unaffected by heat, cold or long-continued stretches of work.

Many years of actual practical operation in territories notoriously severe on tractors has proven Best design, choice of materials and workmanship correct in every detail. Best is one of the pioneers in the tractor industry and Best Tractors have won a wide and enviable reputation on the big heavy duty work of the West and elsewhere.

Best Tracklayers are built in three models—Tracklayer "Sixty"—"Cruiser" (Sixty)—Tracklayer "Thirty." Write for catalogs, prices, specifications, name of nearest dealer.

C. L. BEST TRACTOR CO.
San Leandro California

**BEST
TRACKLAYER
TRACTORS**



Twin Cities Stage Novel Annual Meetings

Minneapolis Holds a Round-up

The annual meeting of the Minneapolis Civic and Commerce Association, held on November 8, was a decided innovation. Because of the inability to secure a dining-room large enough to accommodate more than 600 of its 5,500 members, the Association dispensed with the dinner and substituted a get-together meeting at the city auditorium, which, for the purposes of the evening, was called a "corral."

The meeting was styled the Annual Round-up, and the name surely typifies the spirit which prevailed throughout the evening. Nearly 3,000 of the Association's members came. It was necessary to abandon the usual follow-up of invitations, as the first notice brought in more than enough acceptances to fill the house. So large a gathering under one roof enabled the members to become better acquainted and to learn something of the fine spirit which underlies all the Association's activities.

The program started off with the singing of "Bubbles" by the audience, while several thousand inflated balloons were released from the balconies. And instead of the lengthy formal reports, the activities during the past year were portrayed in scenes acted out by various members. The only serious number on the program was the address delivered by Dr. James E. Freeman, in which he reviewed some of the Association's outstanding accomplishments during the past year, the policies pursued, and some of the things it hoped to achieve during the ensuing year.

The final number was an act in which those taking part, attired in regulation cowboy uniform, gave an imitation of a round-up, which amply justified the committee's promise of a "wild time."

The programs were made up in the form of a newspaper extra entitled *The Evening Whoop*, printed on both sides of a full-size pink-tinted newspaper page. Besides containing the extremely comical program, the paper was filled with fun and jokes, and made a great hit. Copies were distributed free at the auditorium by "newsies" brought from the down-town news stands, who called them out in the usual manner.

Saint Paul Buries "George"

The Saint Paul Association also abandoned its annual dinner this year because of the total inadequacy of the dining-halls to accommodate its large membership, and a desire to bring together at the annual meeting a greater proportion of the members. The meeting was therefore held in Saint Paul's great auditorium on January 11, and the Association invited the leading civic and commercial organizations to participate.

One of the special numbers on the program, contributed by the Business and Professional Men's Association, was an enlargement of the "Know your city" idea, showing the confusion that exists in people's minds regarding the twin cities and the ridiculous mistakes that are made in attributing to Minneapolis matters that relate to Saint Paul, and vice versa.

A real program of work for the Saint Paul Association was developed in a series of original "stunts" in which representatives of the city's nineteen civic and commercial organizations took part. For instance, the delegation from South Saint Paul, by means of a bottle, showed a street that was too narrow. A dummy trolley car placed on the stage illustrated the crowded conditions of the trolley cars due to the limited service. The Midway Club with a band and a small parade, illustrated the industrial advantages of the section from which they came.

The concluding number on the program was the burial of "George," and those who have been inclined to "let George do it" will find that their prop has been removed. A hearse drawn by two dilapidated horses was dragged across the stage, and "George" was laid to rest by the group of "town criers" in a scene indicating to the vast assemblage that "George," the faithful, had died of a broken back from his many years of service. The organizations working for the betterment of Saint Paul have made up their minds to get together in every sense of the word, and do the work themselves.

The affair developed into an immense vaudeville entertainment, with horses, live lions and goats on exhibition. At least 4,000 people were crowded into the auditorium, all "rooting" for Saint Paul.

The City Beautiful

is only possible by proper care of shade, ornamental trees and shrubbery.

Power spraying will do more towards beautiful parks and streets than other methods.



Spray with the **Bean Power Sprayers** and reduce the cost of maintenance.

Then use the same sprayer for whitewashing or coldwater painting your public buildings.

Write today for our latest catalog.

Bean Spray Pump Co.

26 Hosmer St.,

San Jose, Calif.

Lansing, Mich.

HOLT
PEORIA-STOCKTON



"THE NATION'S ROAD MAKER"

State highway department records show that seventy-five per cent of the dust moved in road construction is handled with wheel scrapers.

Handling this work with teams is slow and expensive, but the "Caterpillar" Tractor, with its multiple speed transmission, speeds up the job. Its flexible roller frame construction gives positive traction and its independent clutch control permits shortest turning in narrow cuts or fills.

Contractors and road builders everywhere have found that with "Caterpillar" Tractors and wheel

scrapers they can move more dirt per day, per month or per job, at a lower cost than by any other method.

Bulletin C-158, "The Nation's Road Maker," mailed on request.

The HOLT Manufacturing Co., Inc.

Peoria, Illinois

Spokane, Wash. New York Office, 50 Church St.
Factories at Stockton, Cal. and Peoria, Ill.

There is but one

CATERPILLAR

- HOLT builds it.

Municipal Activities

New York city has adopted an ordinance designed to stimulate construction of dwellings and to relieve the housing shortage under a permissive state law. This ordinance exempts from taxation for a period of ten years dwellings erected between April 1, 1920, and April 1, 1922, up to the sum of \$5,000 for each separate family dwelling, whether a single-family house, a part of a two- or three-family house or an apartment, at the rate of \$1,000 a room, up to five rooms. The period of exemption will run from the date of occupancy.

* * * *

The Community House of the Community Club of Wanaque, New Jersey, the gift of the Wanaque River Paper Company to the borough, has been formally opened. The cost of construction was about \$40,000. On the first floor is a library, a canteen, and an auditorium with balconies, stage and two dressing-rooms. On the second floor there is a billiard room and a room for the local ladies' organizations. In the basement there are shower-baths and a kitchen, and later two bowling-alleys will be installed. The auditorium will seat about 500, and will be used for motion pictures, dances, entertainments and basket-ball.

* * * *

During the past year the total assessed valuation of the cities of the first class increased 19 per cent. The total assessed valuation of the school districts occupied by the cities of the first class increased 18 per cent. The average increase in tax rates for cities of the first class is 12 per cent. The average increase in the school levies of the respective school districts is 29 per cent. The approximate assessed per capita valuation of the cities of the first class is \$1,217, while the same for the state of Kansas is \$2,187.

The total assessed valuation of the cities of the second class increased 15 per cent. In the corresponding school districts the total assessed valuation increased 18 per cent. The average tax rates in the cities of the second class increased 12 per cent,

while the average school tax levies for the corresponding districts increased 33 per cent.

(The above data were compiled by the Municipal Reference Bureau, Lawrence, Kans., from information obtained from 10 cities of the first class and 71 cities of the second class.)

* * * *

Johnstown, Pa., is considering the adoption of a city plan. To promote public interest in the subject, J. D. Ripple, Superintendent of Grammar Schools, introduced the study of the improvement plan into the English course some time ago. At the mid-year graduation exercises it formed the subject of the speeches given in the commencement program. Six boys and girls, chosen after competitive tests, each representing one of the graded schools, discussed with forcible arguments why the report of the city planning commission should be adopted.

The information for the papers and the stereopticon slides was supplied by the Secretary of the City Plan Commission, Leo J. Buettner, who also assisted in training the speakers. The result of the program was a marked increase in public enthusiasm for the opportunities of local city planning.

* * * *

Evanston, Ill., has been experimenting with the use of motion pictures in nature study in the public schools. The Black Swallowtail butterfly was studied from textbooks and actual specimens. The Monarch butterfly was studied by means of a film showing the life history of the insect. The question was then put to a vote of the children as to which of the two methods had been the more effective. The referendum showed 170 out of 180 in favor of the motion picture.

* * * *

William C. Barber, formerly Mayor of Joliet, Ill., has accepted the position of City Manager of Dayton, Ohio. His term of office began February 1. The salary will be \$12,000 a year.

THE AMERICAN CITY

PACKARD



Bigger Yardage

Road builders have found that a Packard Truck, even when shouldering its way through the toughest going, can carry greater loads and more loads in a given time.

This ability to serve its owner profitably is a direct result of the tested design, selected materials and expert workmanship that enter into Packard manufacture, and of the method by which every Packard Truck

is specified to its particular job.

Hart and Page, Chicago contractors, found that their Packard on a good-roads job carried greater pay loads and made from one to four more trips each day than other trucks in the same class of work.

Every Packard Truck has the benefit of the countrywide service facilities established to keep the Packard Truck at the highest possible level of efficiency.

PACKARD MOTOR CAR COMPANY • DETROIT

Ask the man who owns one

The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing
Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

Ordinance Which Forbids Street Parades and Public Assemblages Without a Permit by the Mayor, Upheld

A decision of the Court of Common Pleas for Allegheny County, Pa., announced in the case of *Commonwealth vs. Danich*, 12 Pennsylvania Municipal Law Reporter, 54, upholds the validity of an ordinance of the city of Duquesne, forbidding street parades and public assemblages without a permit issued on the mayor's being satisfied "that the same shall not be detrimental to the public interests." The reasoning of the Court is as follows:

"It is to be observed that the ordinance does not prohibit assemblages, public meetings, etc. On the contrary, it provides that the mayor shall issue a permit therefor, unless detrimental to public interests, and of that the city of Duquesne, acting through and by him, is the judge. It is not the cause of organized labor to which the mayor objects; it is the open discussion of such subject. He cannot refuse a permit because he does not approve of the subject, but the open discussion of the subject presents to him an entirely different question.

"This was an assemblage upon a public street. The avowed intention of the meeting was to publicly discuss a subject in a locality where in the past its discussion has been the cause of riots, bloodshed and death, a subject which at this time provokes great excitement, bitter feeling and inflamed passions among those who discuss it.

"The time of the meeting was fixed for a Sunday afternoon in May, at which time an unusually large number of idle and curious people are on the streets, ready and willing to be entertained by any attraction which might furnish them excitement, many of them no doubt deeply interested in the subject matter of the meetings, having divergent and pronounced feelings, opinions and convictions, and ready, willing and anxious to express them, and in the heat of the argument liable to overstep the bounds of mere verbal polemics.

"Is an ordinance which authorizes a municipality to forbid such a meeting within its limits an invasion of the rights of the people of such municipality? Does it not rather afford a protection to and a preservation of their rights? It is true that the mayor might have thrown a cordon of police around the meeting

and permitted it to proceed, but the presence of police at such times is not always an assurance of peace, and if the mayor in his judgment thought that impractical or unsafe, and that the safer way was to forbid the meeting, how can his action, viewed in the broad sense, be an infraction of the rights of the people?"

Where in Letting of Contract Charter Provision is Violated, Contract Will Not Support Claim for Reasonable Value

Where a charter forbids purchases of supplies, appliances, etc., by a municipality without competitive bidding, where the amount involved exceeds a certain sum, the provision cannot be evaded by splitting up into several purchases what is in reality a single purchase (e. g., a fire and police alarm system). And where the provision is violated, the contract is utterly void; it will not support a claim by the contracting party for the reasonable value of the supplies, appliances or other things furnished the municipality under the contract. (*California District Court of Appeal, Gamewell Fire Alarm Telegraph Co. vs. City of Los Angeles*, 187 Pacific Reporter, 163.)

City's Duty as to Condition of Streets Does Not Extend to Uncontrollable Travel

The obligation of a municipality to keep its public ways in a reasonably safe condition for public travel applies to such persons as travel the ways in the usual modes, and does not extend to undirected and uncontrollable travel, such as a team of horses running away in the absence of its driver. The municipality is not responsible for injury sustained by a person upon the vehicle involved in such runaway, if it results from the uncontrolled action of the team in leaving that part of the public way which is reasonably adequate and safe to travel. (*Ohio Supreme Court, Drake vs. City of East Cleveland*, 127 Northeastern Reporter, 469.)

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Ordinance Requiring Vehicles to Stop at Rear of Street Cars Discharging or Receiving Passengers, Upheld

The Ohio Supreme Court upholds an ordinance of the city of Cleveland, requiring vehicles moving in the same direction as street cars to stop at the rear while such cars are discharging or receiving passengers, excepting that in congested districts vehicles may pass by clearing the lower step of the street car by at least six feet. (128 Northwestern Reporter, 164.) The Court says:

"The provisions of this ordinance constitute a reasonable and proper police regulation to control traffic and protect pedestrians. It is not invalidated, as claimed, because it does not specify or require to be marked or designated the places where street cars may receive and discharge passengers; nor by reason of the requirement that such vehicle must remain standing until the street car resumes motion. The enforcement of the requirements of the ordinance will not constitute an unreasonable and unconstitutional interference with the liberty and rights of any citizen, nor deprive any citizen of equal protection and benefit of the law."

In the Absence of Constitutional Limitation, Legislature Has Power by Statute to Impose Obligation on Municipality

Upholding the right of a treasurer of the city of Richmond to recover compensation against the city under a state law requiring cities to pay certain commissions on tax collections, the Virginia Supreme Court of Appeals says in the case of *Pace vs. City of Richmond*, 103 Southeastern Reporter, 647:

"Authorities are cited to the effect that it is beyond the power of the General Assembly to require a municipal corporation to pay any official a bonus. The validity of these authorities may be conceded, but they are not relevant in this connection. . . .

"However much the Segregation Act may have increased the work of the plaintiff, his duties and responsibilities as treasurer of the city of Richmond, he was not entitled merely on that account to sue the city . . . for additional compensation. But it was competent for the General Assembly, in view of the effect of its statute upon the responsibilities and work of that official, in his city or local capacity, to require the city to increase his compensation. The authority of the act, and not his increase of duties and responsibilities, or his loss of compensation, afforded his right to sue the city. . . . The increase of compensation which it provides is in no sense a bonus.

" . . . If there is no special limitation in the constitution, and the debt or liability is one

to be incurred in the discharge of a public or state duty which it is proper for the Legislature to impose upon the municipality, it can constitute no objection to the validity of the act that the debt or liability is to be created without its consent. The Legislature may direct a municipal corporation to build a navigable watercourse within its limits, or the state may appoint agents of its own to build it, and empower them to create a loan to pay for the structure, payable by the corporation.

"The fact that a claim against a municipal or public corporation is not such a one as the law recognizes as a legal obligation has often been decided by courts of the highest respectability and learning to form no constitutional objection to the validity of a law imposing a tax and directing its payment.

"The Legislature has the power to levy a tax upon the taxable property of a town and appropriate the same to the payment of a claim made by an individual against the town. It can direct the proper authorities of a town to assess a tax, cause the same to be collected, and apply it to discharge of such a claim, even though the claim has been rejected by the voters of the town, and though the claim is not recoverable by action against the town."

Ordinance Prohibiting Construction of Ceiling and Partition Walls of Dwellings Unless Composed of Certain Materials, Held Void

The Illinois Supreme Court has annulled an ordinance of the city of Chicago, which purported to prohibit construction of ceilings and partition walls in buildings of ordinary construction, unless composed of lath and plaster of a combined thickness of at least $\frac{3}{8}$ of an inch. (*McCray vs. City of Chicago*, 126 Northeastern Reporter, 557.) It is held that the ordinance is void as being unjust and unreasonable in its discrimination as to the material to be used for the partitions and ceilings of the rooms in ordinary dwelling-houses. But the Court conceded:

"That an ordinance is not discriminatory where it operates on all persons engaged in the same business or calling alike, and where there is no other calling or business in precisely the same position"; "that an ordinance that fairly tends to serve and promote the public health or safety is reasonable"; "that any one attacking an ordinance because unreasonable must show affirmatively wherein the ordinance is unreasonable"; "that courts will not disturb an ordinance of the character here in question when there is room for a difference of opinion as to whether or not the public safety will be promoted by the provisions of the ordinance"; and "that on a question whether or not a particular thing may or may not be detrimental to public safety, the determination by the legislative body, if it has not acted unfairly or arbitrarily, will be held conclusive."

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Decision Holding Invalid an Ordinance Regulating the Use of Snow Sweepers by Street Railway Company

Is it within the power of a municipality to require a street railway company operating within its limits to refrain from using a snow-sweeper or snow-plow in such way as to pile snow along street sides?

This question is answered in the negative by the Court of Common Pleas for Luzerne County, Pa., in the case of *W. B. R. R. Co. vs. Sugar Notch Borough*, 12 Pennsylvania Municipal Law Reporter, 36. Although the decision is not one of a court of last resort, it is of importance because relating to a question upon which it seems that the law is not well settled by appellate court precedents.

It seems that the ordinance was so worded as to require the plaintiff street railway company to remove from the borough all snow removed from its tracks. The Court holds that this ordinance was not justified by charter power in the borough to regulate streets, etc., and to prohibit obstructions or nuisance therein. In reaching this conclusion, the Court says:

"No abutting property owner had the specific right to have this ice and snow removed in the manner provided in this ordinance. The rights of abutting property owners, like the rights of all persons entitled to travel up and down the highway, are to have the use of the highway regulated under the supervision of the municipality through the adoption and enforcement of reasonable ordinances.

"The defendant is charged with the duty of removing obstructions from the street and keeping the street in a reasonably safe condition for public travel, and it was in the performance of this duty that the borough officials have attempted to regulate the use of electric snow-sweepers, which pile up the snow upon both sides of the tracks and prevent the use, either by abutting owners or by the general public, of any other part of the street for the purpose of passage or across to their own premises. But if we are correct in the main conclusion of law at which we have arrived, then the attempt by this borough was not a reasonable exercise of its authority.

"The plaintiff company, by reason of its right to operate a single-track railway on Main Street, in the defendant borough, has also the right to such incidental use of the land within the street immediately adjoining the railway as is consistent with the reasonable use of the street by the general traveling public, and as is incidentally necessary to enable the plaintiff to operate its railway.

"The said railway company in removing snow from its tracks must act with due regard to the right of travelers upon the highways and so as not to interfere, needlessly, in a practical sense, with the safety and convenience of persons lawfully using the street in an ordinary way.

"If as an incident to the operation of its rights under the franchise ordinance of August 24, 1892, it becomes necessary to remove snow and ice from its tracks, the plaintiff may do so, provided that thereby it does not unreasonably interfere with other public travel upon the said street.

"We do not decide that conditions may not arise under which removal of snow in some particular way might not become a public nuisance. We decide only that by removal of snow, as shown to have been done in this instance, there has not arisen a per se public nuisance, but that the inconvenience suffered by the public upon the street was a necessary incident of weather and seasonal conditions, which imposed various disadvantages that must be proportionately borne by all who lawfully travel upon the street, until by a reasonable exercise of municipal power these disadvantages are otherwise provided for."

Act of Arkansas Legislature That City Manager Need Not Be Resident of City, Held Unconstitutional

A city manager is an "officer" within the meaning of the provision in the Arkansas constitution that no person shall be elected or appointed to an office who does not possess the qualifications of an elector. Hence, the act passed by the Arkansas Legislature in 1917 is invalid in so far as it provides that city managers need not be residents of the cities whose affairs they are chosen to manage. (*Arkansas Supreme Court, McClendon vs. Board of Health of City of Hot Springs*, 216 Southwestern Reporter, 289.)

On the Calendar of Conventions

APRIL 27-29.—HOUSTON, TEX.

American Society of Civil Engineers. Annual convention. Secretary, Charles W. Hunt, 33 West 39th Street, New York, N. Y.

APRIL 27-29.—ATLANTIC CITY, N. J.
Chamber of Commerce of the United States of America. Annual meeting. Secretary, D. A. Skinner, Riggs Building, Washington, D. C.

APRIL 28-29.—ATLANTIC CITY, N. J.
New Jersey Mosquito Extermination Association. Annual meeting. Secretary, Thomas J. Headlee, New Brunswick, N. J.

tion. Annual meeting. Secretary, Thomas J. Headlee, New Brunswick, N. J.

MAY 9-11.—BUFFALO, N. Y.

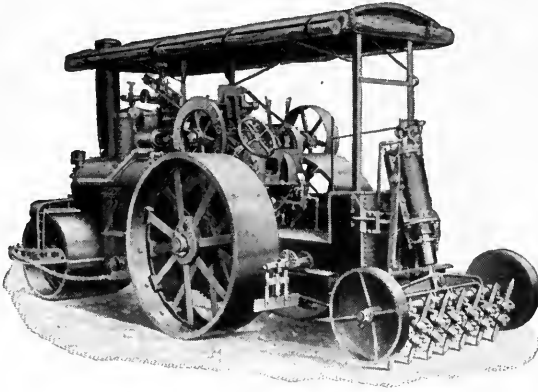
American Association of Engineers. Annual convention. Secretary, C. E. Drayer, 63 East Adams Street, Chicago, Ill.

MAY 11-14.—JACKSONVILLE, FLA.

Southern Commercial Secretaries' Association. Annual convention. Secretary, G. T. Cross, Monroe, La.

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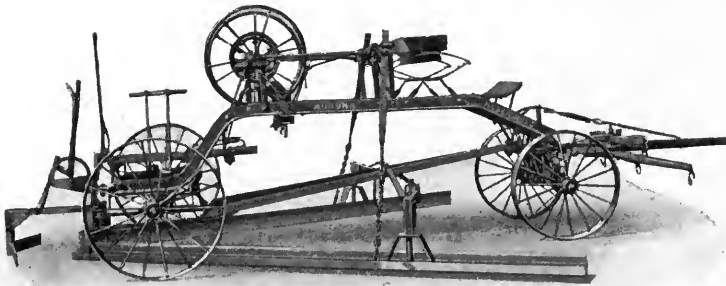


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Oklahoma City

Municipal and Civic Publications

THE PRACTICE OF SILVICULTURE—WITH PARTICULAR REFERENCE TO ITS APPLICATION IN THE UNITED STATES

Ralph C. Hawley, Professor of Forestry, Yale University. John Wiley & Sons, Inc., New York. 1921. xi + 352 pp. Diagrams and tables.

A practical text-book on the methods of handling forests, for the use of those engaged in developing commercial or municipal forests in the United States. This book covers a field previously unfilled and should prove invaluable to the many officials throughout this country who desire to establish forest tracts for commercial purposes or for the benefit of municipalities. It contains a complete discussion of the methods of reproduction of forests, outlining the treatments of the tract during the period of regeneration or of establishment. The clear-cutting method, the seed-tree method, the shelter-wood method, the selection method, and the coppice method of regeneration are described in detail, with diagrams to help the forester to choose the proper method for his particular tract. The proper manner of cutting, methods of slash disposal, protection against forest fires, insects and tree diseases, as well as the various effects of animal grazing in a forest tract, are admirably discussed. This is a book which will be sought by municipal officials in growing numbers with the increasing appreciation of the value of municipal forests.

HOUSING PROBLEMS IN AMERICA

Proceedings of the Eighth National Conference on Housing, at Bridgeport, December, 1920. Published by the National Housing Association. ix + 386 pp.

Contains the complete papers presented at the conference, together with the discussions. There are the reports from the delegates, the report of the Secretary, and lists of delegates and directors. Among the subjects considered were: "Exemption from Taxation and Other Subsidies"; "Investing in Real Estate Mortgages"; "Coöperative Housing"; "Unwise Building Laws"; "Housing in France"; "What is a Fair Rent?"; "English Garden Communities." This is by no means a complete list, but it illustrates the wide variety of topics considered.

THE TWENTIETH CENTURY RURAL SCHOOL

E. E. Davis, M.A., Rural Life Specialist, University of Texas. Bobbs-Merrill Company, Indianapolis. 1920. 242 pp.

This volume has been prepared for county school superintendents, members of county boards of education, rural school and village teachers, the rural school sections of teachers' institutes, and for classes in rural education in state normal schools. It has been prepared from the viewpoint of the country teacher facing actual conditions at close range, rather than from the viewpoint of the college man interpreting rural data at long distance.

NOTES ON IRRIGATION, ROADS AND BUILDINGS AND ON THE WATER SUPPLY OF TOWNS

William Lumisden Strange, E. P. Dutton & Company, New York. 1920. xxiii + 849 pp. Diagrams and tables.

A collection of notes made by a prominent English engineer on the subjects outlined in the title. Under Irrigation, the subjects of rainfall, river discharge and supply, large reservoirs, masonry dams, earthen dams, weirs, canals, embankments, silt, regulation, distribution, law, finance and administration are covered. Under the subject Water Supply of Towns, the following subjects are taken up: pumping and distribution, supply works, water-borne diseases, etc. Under District Roads, all phases of road design and construction are discussed in detail.

CONCRETE WORK—VOLUME I

William Kendrick Hatt, Professor of Civil Engineering, Purdue University, and Walter C. Voss, Department of Architectural Construction, Wentworth Institute, Boston, Mass. John Wiley & Sons, Inc., New York. 1921. xix + 451 pp. Diagrams, illustrations and tables.

A book particularly adapted to industrial schools, to aid the self-development of workers in concrete, and for students in engineering. The text contains discussions of plans, details and specifications, shows the layout of different types of footings, concrete walls, the erection of reinforcing for concrete, the manufacture of pre-cast stone, the building of walls and partitions, the laying of concrete walks and pavings, methods of building finish, special concrete construction, and a closing chapter on estimating.

JOT—THE QUICK-WRITING SYSTEM

Milton Wend, Tribune Building, New York City. 24 pp.

A compact, well-written instruction manual, describing a new system for quick writing to conserve the time and energy of busy people. It is not a system of shorthand, but uses the characters of the alphabet in a logical, scientific manner for the rapid recording of notes. An excellent volume for city clerks, clerks of committees, chamber of commerce secretaries and other executives who must take notes hurriedly at meetings.

DEMOCRACY AND ASSIMILATION

Julius Drachslor, Assistant Professor of Economics and Sociology in Smith College. The Macmillan Company, New York. 1920. 275 pp.

Dr. Drachslor analyses some of the basic facts of the problems of immigration and assimilation, with a particularly detailed discussion of intermarriage, and the resultant effects on American life. The effects of the war on the "melting pot," and the subject of Americanization, are taken up at length. The statistical tables in the appendices, especially those covering vital intermarriage in the racial groups of New York City, will be interesting to sociologists.

The publications listed above are for sale by their publishers. Those listed below are understood to be free upon application.

INDUSTRIAL HOUSING

"Industrial Housing," by Clinton Mackenzie. The Knickerbocker Press, New York City. 71 pp. Illustrated. 1920. The author has been Tenement House Commissioner in New Jersey, and a Director of the National Housing Association. The book describes in detail such housing developments as those in Kingsport, Tenn., Milton, Pa., and elsewhere. (Apply to the author, at 15 Broad Street, New York, N. Y.)

COMMUNITY BUILDINGS

"Plans of Rural Community Buildings." By W. C. Nason, Assistant in Rural Organization, under the direction of C. J. Galpin, Economist. Published by the United States Department of Agriculture as Farmers' Bulletin 1173. 38 pp. Illustrated. 1921. Pictures, plans and descriptions, with costs of various types of community buildings suitable for villages. (Apply to W. C. Nason, Assistant in Rural Organization, United States Department of Agriculture, Washington, D. C.)

SERVICE AT COST

"Danger Points in Service-at-Cost Plans," by Delos F. Wilcox, Ph.D. Published as Leaflet No. 2, Public Utilities for Public Service. 1921. An account of the workings of the Service-at-Cost plan in Cleveland, and an analysis of the principal dangers in the scheme, which should be avoided by cities considering its adoption. (Apply to Delos F. Wilcox, Ph.D., 73 Gleane Street, Elmhurst, L. I.)

FORESTRY

Proceedings of the Second Southern Forestry Congress, held at New Orleans, La., January, 1920. 156 pp. 1920. Contains complete papers and discussions of the Congress, also the list of registered delegates. (Apply to J. S. Holmes, Secretary, State Forester, North Carolina Geological and Economic Survey, Chapel Hill, N. C.)



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MODERN ROADS

"Modern Road Building and Maintenance—Principles and Practice," by Andrew P. Anderson, Highway Engineer, Bureau of Public Roads, U. S. Department of Agriculture. An exceedingly well-prepared paper-covered book of 146 pages, with numerous illustrations. Published for the use of engineers, contractors, road officials, students, and all others who are interested in the problems of public roads and their traffic. It deals with the following topics in relation to all kinds of roads: Planning the Road; Road Materials; Road Construction; Road Maintenance and Repair; and The Use of Explosives. (Apply to the Hercules Powder Company, Wilmington, Del.)

CITY PLANNING IN CAMBRIDGE, MASS.

Annual Reports of the Planning Board to the City Council of the City of Cambridge, Mass. Covers the years 1918-1919-1920. Maps and illustrations. (Apply to Arthur C. Comey, Secretary, Abbot Building, Harvard Square, Cambridge, Mass.)

HOUSING

"The Housing Situation and the Way Out," by Lawrence Veiller, Secretary, The National Housing Association. Reprinted from the "Architectural Record," December, 1920, as National Housing Association Publication No. 55. A discussion of the housing shortage and an argument for federal aid to meet the problem. (Apply to the National Housing Association, 105 East 22d Street, New York, N. Y.)

NEW YORK HARBOR

Two reports of the New York, New Jersey Port and Harbor Development Commission. One is the Summary of the Joint Report with Comprehensive Plan and Recommendations. 65 pp. and map. 1921. Published as Legislative Document (1921), No. 33. This has been condensed from the two-volume report on port developments, which will appear shortly. The other consists of the advance issue of Chapters 9, 10, 11 and 14 of the Joint Report. 52 pp. 1920. Maps and diagrams. Covers in detail the elevated and underground railway freight projects and a discussion of the automatic electric system. (Apply to William Leary, Secretary, 115 Broadway, New York, N. Y.)

HOUSING AND LABOR

"The Housing Problem in Its Relation to the Contentment of Labor," by Morton C. Tuttle, General Manager, Atherthaw Construction Company. Reprinted from the "Manufacturers' Record" at the suggestion of the National Housing Association. 1920. (Apply to the National Housing Association, 105 East 22 St., New York City, N. Y.)

PUBLIC UTILITIES

"The American Public Utilities Bureau and What It Can Do for You." Bulletin No. 1 of the American Public Utilities Bureau. A brief sketch of the public utility question and a prospectus of the services which the Bureau is prepared to offer to cities and utility corporations in adjusting their problems. (Apply to The American Public Utilities Bureau, 175 Fifth Ave., New York City, N. Y.)

ST. LOUIS TRANSIT SYSTEM

"The St. Louis Transit System, Present and Future," by Harland Bartholomew, Engineer of the City Plan Commission. 30 pp. Maps and diagrams. 1920. Contains survey of the present situation and plans for more effective re-routing of transit lines. (Apply to Frank E. Lawrence, Jr., Secretary, City Plan Commission, St. Louis, Mo.)

MOTOR TRAFFIC

"Proposed Uniform Vehicle Law," as endorsed by the Motor Vehicle Conference Committee. 32 pp. The proposed law was prepared by a committee representing a number of interested organizations, after a thorough consideration of the subject from the standpoint of the road builder, the user of the road, the manufacturer of vehicles, the carrying capacity of the road, the pedestrian, and the general public's welfare and safety. (Apply to the National Automobile Chamber of Commerce, Inc., Marlin-Rockwell Building, 366 Madison Avenue, New York, N. Y.)

PUBLIC WORKS

First Biennial Report of the Department of Public Works of the State of Idaho, for the period ending December 31, 1920. 221 pp. Illustrated. Part 1 contains the reports on Capitol Construction, Capitol Maintenance, the Bureau of Supplies, and Heyburn Park; Part 2, the report of the Bureau of Highways. (Apply to William J. Hall, Commissioner, Boise, Idaho.)

COMMUNITY TRUSTS

Two pamphlets: "The New York Community Trust," by Joseph N. Babcock, Vice-President, The Equitable Trust Company of New York; and "The Fundamentals of a Community Trust," by Frank J. Parsons, Director of the New York Community Trust. These pamphlets give a concise idea of the objects and methods of community trusts. (Apply to Frank J. Parsons, Director, The New York Community Trust, 55 Cedar Street, New York, N. Y.)

HIGHWAYS

Second Biennial Report of the State Highway Commission of Wyoming, for the period beginning February 28, 1919, and ending September 30, 1920. 121 pp. Illustrated. (Apply to C. E. Hoffhine, Chief Clerk, Wyoming Highway Department, Cheyenne, Wyoming.)

PUBLIC UTILITIES

"Flexible Fares." A discussion of service at cost as applied to the New York Transit Lines, with comment on Governor Miller's program. 46 pp. 1921. Prepared by the City Club Committee on Public Service, and issued by the City Club. (Apply to Henry C. Wright, Chairman, Committee on Public Service, The City Club of New York, 55 West 44th Street, New York, N. Y.)

THE FORESTS OF OREGON

Tenth Annual Report of the State Forester of Oregon for the year ending December 31, 1920. 60 pp. Illustrated. Especial attention is given to the aeroplane patrol. (Apply to F. A. Elliott, State Forester, Salem, Ore.)

ELECTIONS

"The High Cost of Elections." 24 pp. 1921. A report prepared by the Chicago Bureau of Public Efficiency covering conditions in Chicago and Cook County. (Apply to Harris S. Keeler, Director, Chicago Bureau of Public Efficiency, 315 Plymouth Court, Chicago, Ill.)

FORESTRY IN MAINE

"Forest Protection and Conservation in Maine." By Forrest H. Colby, Land Agent and Forest Commissioner. 1919. 163 pp. Illustrated. A detailed account of forestry work and fire prevention in the state of Maine, together with the Maine forestry laws. There is a chapter on the Forestry Department of the State University and a report on the spruce budworm and white pine weevil, by M. W. Blackman, Ph.D., Professor of Entomology, New York State College of Forestry, Syracuse, N. Y. (Apply to Forrest H. Colby, Forest Commissioner, Bingham, Me.)

Municipal Reports

Montclair, N. J.—Twenty-fifth Report of the Board of Health. From January 1, 1919, to December 31, 1919. (Apply to Herbert B. Lerner, S.B., Health Officer and Registrar, Montclair, N. J.)

Johnstown, N. Y.—Forty-third Annual Report of the Board of Water Commissioners. Filed with City Clerk January 20, 1921. (Apply to Grover E. Yerdon, City Clerk, Johnstown, N. Y.)

Dayton, Ohio.—Annual report, Division of Health, Department of Public Welfare, for the year 1920. (Apply to D. F. Garland, Director of Public Welfare, or

A. O. Peters, M.D., Commissioner of Health, Dayton, Ohio.)

Kalispell, Mont.—Seventh annual report of the Water Department for the year ending December 31, 1921. (Apply to W. H. Lawrence, Superintendent of Water Department, Kalispell, Mont.)

White Plains, N. Y.—Building Zone Ordinance for the City of White Plains, effective June 29, 1920. (Apply to William H. Carpenter, Jr., City Clerk, White Plains, N. Y.)

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News for Boards of Public Works, Engineers, Contractors, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

A Useful Mop and Water Truck

It is a sloppy job to carry water for washing floors around in a pail which has to be emptied frequently. The Kent Vacuum Cleaner Company, Rome, N. Y., has recently placed on the market the "Utility" mop and water truck, which is made expressly to handle the clean and dirty water incidental to scrubbing. This outfit, which is specially suitable for schools and all other public buildings, takes the place of pails and is made in two sizes. It is claimed that one man and a truck equipped with two 15-gallon cans and a mop-wringer, can carry as much water as five men with two 12-quart pails each.

The cleaning and mopping can be done without constantly changing or using the same water over and over. The operator is able to stand erect when using the wringer, mounted on top of one of the cans. The outfit consists of two cans, one for clean water and one for dirty water. The cans are heavily wired around the top and bottom and are covered with non-rusting solution, so that they are not affected by the strongest soap or soap powders. The truck is equipped with four heavy rubber-tired wheels and can be easily moved about.



A HANDY COMBINATION FOR JANITOR OR PORTER

Meeting of Southwest Water Works Association

The Southwest Water Works Association, comprising the eight states of Texas, Arkansas, Oklahoma, Louisiana, Missouri, Kansas, Nebraska, and New Mexico will hold its annual convention in Oklahoma City, May 9 to 12, inclusive, with headquarters at the Skirvin Hotel. Over 500 water-works superintendents will attend the convention, and in addition guests and material men are expected to be out in force. Full information may be secured from the Secretary, E. J. Fullerton, 657 West

Hollow Building Tile in Movies

The Hollow Building Tile Association, Conway Building, Chicago, Ill., has just announced the completion of a two-reel motion picture, showing the manufacture and advantages of hollow building tile.

The film takes up the manufacture of hollow tile at typical plants, shows the removal of the clay and how it is ground, mixed and finally comes out of the die shaped. It is cut into lengths, conveyed to the drying room and burned in the kiln. Following this there is an animated cartoon illustrating the insulation properties of hollow tile. A hollow-tile house and an ordinary house are shown in the foreground. Up in the sky the Sun frowns menacingly and blows his breath at the two houses. His breath at first seems to be a cloud traveling toward earth, but as the cloud comes close the audience sees that it is made up of a myriad of little figures, "heat-devils," armed with forked spears and adorned with forked tails. These devils dive through the walls of both houses and disappear. The scene inside the ordinary house reveals the heat devils in a victory dance around the sweltering housewife. A scene inside the hollow-tile home shows the

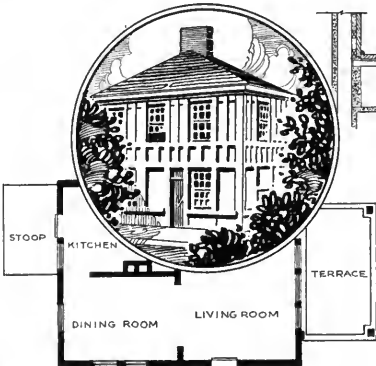
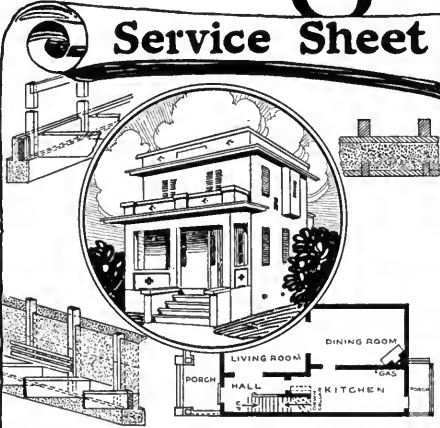
housewife perfectly comfortable and not a heat devil in sight. They are then shown in the air spaces, where they disappear in clouds of smoke. Animated thermometers register the result, 106 degrees outside and 72 inside. Another animated scene shows winter, and Jack Frost blowing a cloud of "chilly children" toward the two houses. Similarly as in the summer scene, the audience is impressed with the fact that the air spaces form an insulation barrier which the cold of winter cannot penetrate. Still further illustrations show the fire-proof qualities of hollow tile.

This film is intended first to make the round of Association members, then a tour of chambers of commerce, Rotary clubs, etc., and for use at various builders' conventions. With one of the De Vry suitcase projection machines the film can be shown in any place where connection can be made with an electric light socket, and the picture will be exhibited before Y. M. C. A.'s, high school classes, at farmers' grange meetings and eventually at smaller

THE AMERICAN CITY

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Service Sheet



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SEVERAL years ago the increasing interest in small homes of permanent, fireproof type prompted us to prepare a Service Sheet on a type of employees' house that we had built at two of our own plants.

This Service Sheet proved to be so popular that we prepared three others—the series of four sheets giving fairly complete details, working methods, specifications, etc., of (1) Pre-cast Slab and Beam house construction, (2) the Guniting-and-Frame Method, (3) Solid and Double-Wall construction with special forms and (4) the Ingersoll Home System, which has lately attracted considerable attention.

We have a small reserve stock of these practical Service Sheets and will gladly send copies to any manufacturer, engineer, architect, contractor, builder, chamber of commerce, or property owner interested.

Copy of the 96-page ALPHA Handbook will also be sent free of obligation. No charge if you live east of the Mississippi River. We feel obliged to ask those living out of our sales territory to send fifty cents to cover cost of printing and mailing this literature.

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**AUTO GOING 10 MILES PER HOUR ON UNOILED ROAD,
JULY 3, 1906**

roads of the dust nuisance, oiling forms a blanket on the surface of the roadway and thus reduces the cost of maintenance of highways that are treated in this manner.

Installation the Vital Question with Outdoor Fountains

The difference in results obtained from out-of-door drinking fountains is a matter of serious consideration among many city authorities and park boards. Some communities have had perfect satisfaction, while others report broken fixtures, chipped enamels and destructive freeze-ups before the first winter is over.

The whole difficulty seems to lie in the consideration given before installing. First of all, to be correct from any standpoint, the fixture must be anti-freezing to operate the year round in the open,

The Value of Oiled Roads

The accompanying illustrations, which were furnished us through the courtesy of F. P. Allen, manager, Road Oil Department, The Standard Oil Company, of Indiana, show in an excellent manner the value of oiled roads. The first photograph shows Observatory Road, the West End of Cincinnati, an unoiled highway, with an automobile traveling at 10 miles per hour. The dust coming from the front wheels is dashed aside like the water from the prow of a liner and completely obscures the view in the rear of the automobile. The other photograph, taken at the same time on Grandin Road, Cincinnati, shows the oiled road-bed with an automobile going at 15 miles per hour, and the entire elimination of dust. In addition to riding



**AUTO TRAVELING AT 15 MILES PER HOUR ON AN OILED
ROAD, JULY 3, 1906**



Maintaining Park Roads

As a result of careful planning to attain the "City Beautiful," most main arteries of travel from one section of a city to another is through its parks, this produces very heavy traffic.

Quite often, parks containing hundreds of acres had their beginning in just a small plot of ground; additions were made, the management changed frequently, and as a consequence one single park may contain almost every kind of road.

To be able to repair the various roads, a large amount of equipment is required.

The beautiful parkway shown above constructed of

STANOLIND PAVING ASPHALT, "C"

has been in use for over 5 years, and at the present time it is in perfect condition, without one cent having been spent for maintenance.

We believe that no better kind of roadway for parks was ever devised than those of asphalt.

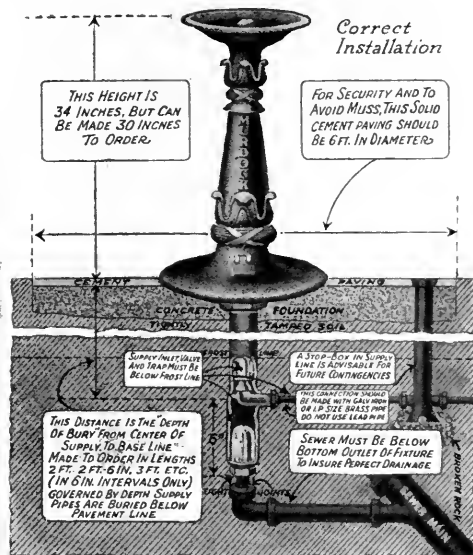
Our booklet "Stanolind Paving Asphalt" containing information regarding this type of road as well as all other asphaltic roads will be mailed free upon request.

STANDARD OIL COMPANY

(INDIANA)

910 So. Michigan Ave.

Chicago, Ill.



THE PROPER METHOD OF INSTALLING AN OUTDOOR FOUNTAIN

and not require repairs or replacement. Second, it must have a strong water-supply control, so as to conserve the use of water and make the fixture practical. Third, it must draw a fresh supply of water from the main for each drink and not use warm, stagnant water from its stand-pipe which may become polluted and unsanitary during the heated months of the year. After these fundamental precautions it should be remembered that all vitreous substances, such as porcelain or enamel, will chip and fracture, and will withstand neither the ravages of winter nor the mistreatment of public usage. Polished bronze or brass and solid iron, painted, are the only materials which should be used in the construction of outdoor drinking fountains.

Many cities have found the Murdock "Bubble-Font," made by the Murdock Manufactur-

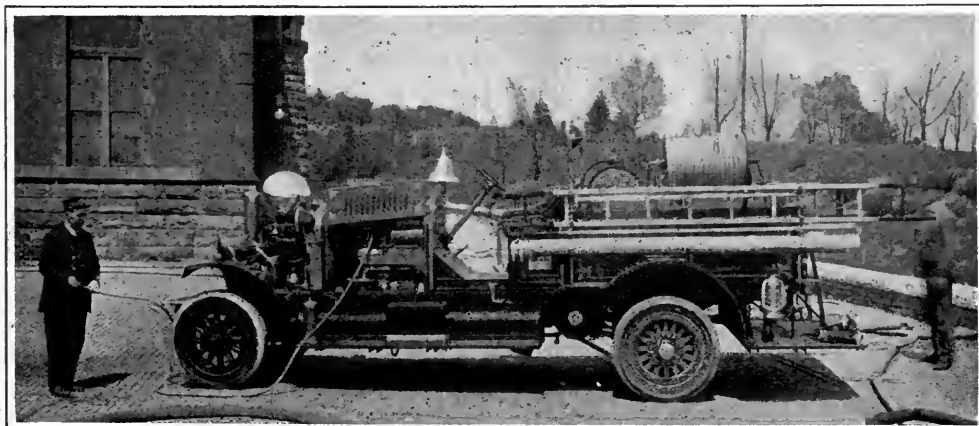
ing & Supply Company, Cincinnati, Ohio, to be very practical for out-of-door use.

Experience has developed a standard method of installation for an out-in-the-open, all-year-round drinking fountain that is put in for the purpose of being a real service to the public, a fountain that is still operating after the first hard freeze and is ready to use at any moment when the early spring sunshine tempts the public out into the open. This method of installation, shown in the accompanying illustration, will be of value to readers of THE AMERICAN CITY.

Thawing Frozen Hydrants

In localities affected by a freezing temperature, the steam fire engine boiler was always dependable for an abundant supply of live steam, with the aid of which frozen hydrants were readily thawed and placed in service in time of fire. The absence of steam for thawing purposes has sometimes been an argument against the use of gasoline-driven fire engines and although many have waived the benefits of steam for thawing purposes, in order to gain the many superior advantages of the more modern gasoline engine, the lack of thawing facilities has always been deplored among firemen when dealing with cold weather problems.

The Ahrens-Fox Fire Engine Company, Cincinnati, Ohio, has developed a thawing device which can be attached to the gasoline fire engine and used at once upon arrival at a frozen hydrant. This thawing apparatus is a complete miniature steam generator, comprising a boiler with all the essential appliances, such as pop safety valve, pressure gauge, glass water gauge, steam valve and connection for thaw hose, drain and blow-off valves. The heating unit uses the exhaust gases from the engine and vertical tubes for the heating surfaces, making it possible to generate steam quickly. The steam pressure used is about 15 pounds per square inch and without replenishing the water-supply in the boiler will furnish steam through a 1/8-inch diameter orifice for about 30 minutes. The apparatus is detachable, because, obviously, it is needed only as the seasons demand.



THE AMERICAN CITY

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Equal to the Demands of City Traffic

Few pavements can withstand the constant abrasion of horses' feet and the damaging pounding of motor truck tires and chains like Bitoslag does. It is a pavement that

Wears Like Iron

and lasts many years. It is simple in construction and is equally durable and effective on country highways or city streets. Extremes of temperature have no effect on Bitoslag roads. Let us know your needs and we will be glad to consult with you at once to your advantage.

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BUCHTEL AVENUE, AKRON, OHIO, A RESURFACED BRICK STREET

Rock Asphalt for Street Maintenance

Street maintenance is no small problem, especially in those cities which are not equipped for mixing and laying bituminous materials. Work is often neglected until the streets are beyond repair and complete reconstruction is necessary. Recently several cities have adopted natural rock asphalt for patching and resurfacing. The material is ready-mixed, and has a further advantage in that it can be laid cold. The finished surface is much the same as a sheet asphalt pavement.

Much success has been obtained in the resurfacing of old brick pavements with rock asphalt. The accompanying illustration shows a typical resurfaced street in Akron, Ohio. The old brick street was first rolled to develop all weak spots, and the depressions were filled to the proper grade. The surface was then thoroughly cleaned and a coat of asphalt paint applied. On top of this, Kentucky rock asphalt, furnished by the Kentucky Rock Asphalt Company, Louisville, Ky., was spread to a depth of 3 inches loose, and compacted to a depth of 2 inches under the roller. The street was opened to traffic after 3 days' rolling.

Practically all rock asphalt used east of the Mississippi comes from Edmonson County, Ky., and is known as Kentucky rock asphalt. The material occurs in great rock formations underlying the surface like seams of coal. Undoubtedly the deposits were once great beds of oil-bearing sand. The lighter oils gradually evaporated, leaving a heavy asphalt residue or bitumen which bound the sand together into solid rock. This rock is now being quarried and broken up on a large scale. The pulverized rock is a product much like a sheet asphalt mix.

New Atlanta, Ga., Office

The National Steel Fabric Company, 908 First National Bank Building, Pittsburgh, Pa., announces the opening of an office in Atlanta, Ga., in charge of H. S. Gibboney, District Manager, 604 Walton Building, Atlanta, Ga.

A New Excavator Crane for All Types of Work

Progressive manufacturers of earth-moving machinery are continually at work to improve the various types of excavating machinery. One of the most recent developments which has been brought out by Pawling & Harnischfeger Company, Milwaukee, Wis., is known as its No. 206 machine, which is a heavy duty, large capacity, excavator of the full tractor type. The corduroy traction for this crane consists of cast-steel treads 20 inches in width. The sprockets which are placed on 9-foot centers are manganese steel, bronze-bushed, and adjustable to take up wear. The short-turning radius makes it easy to handle, and a complete turn in twice its width is possible. The elimination of leading-wheels gives this crane a larger radius of operation.

In order to facilitate the movement of the crane, two traction speeds are provided, one for moving from one location to another over roads or good earth surfaces, and a lower speed for traveling over soft or extremely hilly districts, or when coming out of deep ditches. The power plant consists of a four-cylinder Waukesha heavy-duty motor of 50 h. p. with Warner vacuum feed so that fuel is supplied the engine regardless of the position of the crane, and a storage tank carried below at the rear contains sufficient fuel for about 20 hours' continuous operation. For use with a $\frac{3}{4}$ -yard bucket, a 30-foot boom of braced structural steel is furnished, or a 38-foot boom for a $\frac{1}{2}$ -yard bucket or for drag-line or clam-shell buckets.



AN ALL-ROUND CRANE



For Heating and Applying under Pressure all varieties of Bituminous Materials, Hot or Cold, for Road Construction, Maintenance or Dust Laying.

Heat and volume under instant control of operator. Positive pressure produced by the Kinney Pump.

PATENT COMBINATION Auto Heater and Distributor

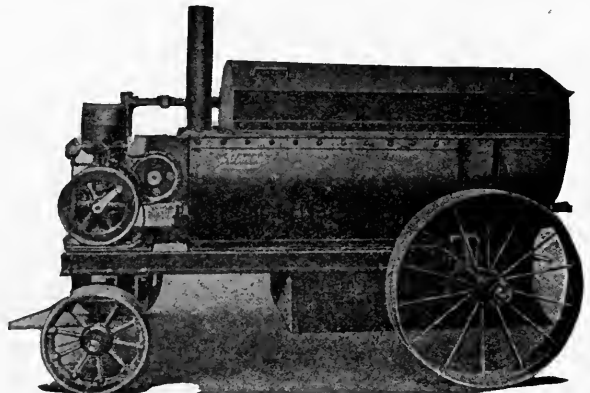


HANDY HEATER and SPRAYER

Especially adapted for Road maintenance, construction and general repair work. Contents constantly agitated while heating.

No burning or coking of material. Pump, Piping, Hose, Nozzles, Automatically Heated.

No Steam Required.



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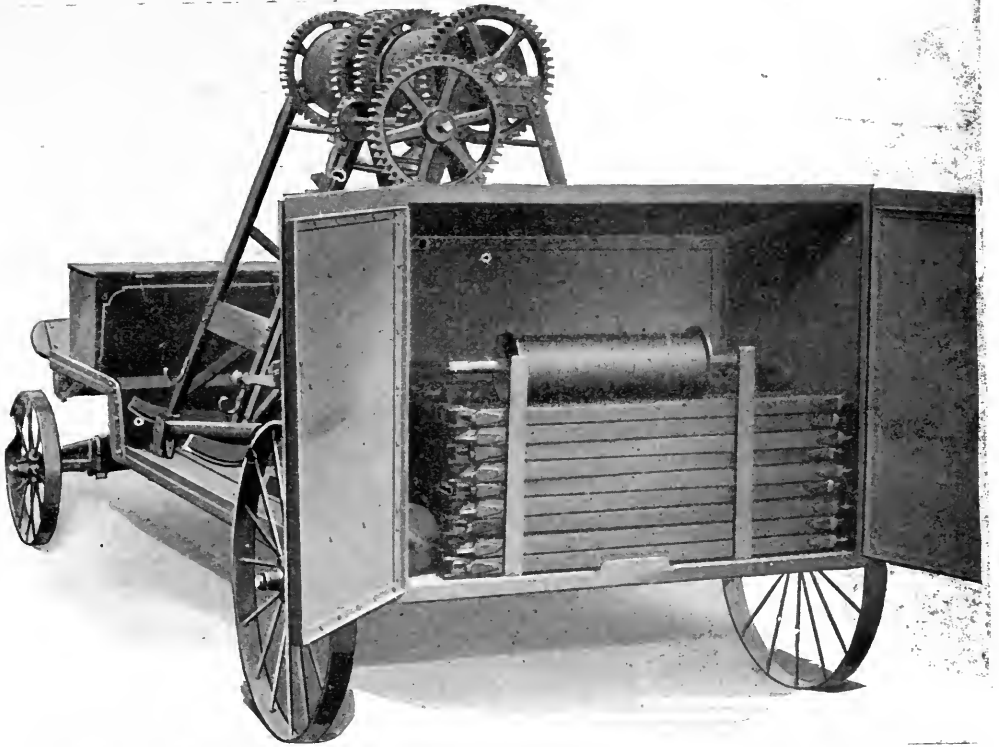
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THE ENTIRE CLEANING EQUIPMENT READY IN A TRAILER FOR CLEANING SEWERS IN ANY PART OF THE CITY

Portable Sewer Cleaning Equipment

For a number of years the Turbine sewer cleaning machine has been well known to municipalities which have had trouble with clogged sewers. This machine has been called a great many strange names, among them the "go-devil" by a man in the South who was greatly surprised at the speed and determination it showed in opening up an almost completely clogged sewer line.

The Turbine Sewer Machine Company, 195 Eleventh Street, Milwaukee, Wis., has just developed a portable mounting for this machine, which is depicted above. This trailer device, which can easily be pulled by any sewer department service truck, enables the gang to have all the tools and the machine under lock and key at all times when not in use. Thus the machine may be hauled out in the morning to a job and worked all day, and, if the complete line has not then been opened up, the machine can be stored in the box, locked up with all the tools in the truck mounting, and rest secure from any danger of theft.

New Road Machinery Booklet in Spanish

F. H. Conklin and W. G. Harrington, Inc., 50 Church Street, New York City, acting as the Export Department for the Good Roads Machinery Company, 266 Bulletin Building

Philadelphia, Pa., has published a complete catalog of Champion and Climax rock-crushing and road-building machinery, Monarch road rollers and Winner road graders in Spanish for the Central and South American export trade.

Acknowledgment

The interesting aeroplane photograph showing the concrete pavements and sidewalks in Knoxville, Tenn., which appears as the front cover of this issue of *THE AMERICAN CITY*, was furnished through the courtesy of the Portland Cement Association, 111 West Washington Street, Chicago, Ill. Knoxville, Tenn., is an excellent example of a city built from a city plan, as it was developed during the war as one of the industrial housing schemes.

Better Lighting for Salt Lake City

A contract has just been given to the Utah Power & Light Company by Salt Lake City for an extensive addition to the city's ornamental street lighting system, which when executed will give Salt Lake the distinction of being one of the best lighted cities of its size in the world.

The contract calls for 112 standards, each carrying three 6.6-ampere General Electric Company's ornamental luminous arc lamps. The Union Metal Manufacturing Company, Canton, Ohio, will furnish the standards, which

Coldwell Lawn Mowers

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New York



THE NEW SALT
LAKE CITY
STANDARD

will envelop the present trolley poles and carry two lamps below the trolley wire and one above. The total cost of the installation will be approximately \$100,000.

Of special significance is the fact that the extension to the lighting system was brought about directly as the result of the success attending the first installation. Salt Lake City will now have 182 lighting standards with 546 luminous arc lamps, giving a total candle-power of 819,000 on less than two miles of streets, which is approximately 90 candle-power per foot of street lighted. The second installation is interesting proof that after three years' trial of the intensive white way the business men of Salt

The auto-conveyor has a water-tight body of 8 cubic yards capacity with a bucket or skip of $\frac{1}{2}$ -cubic-yard capacity, which operates on a track attached either to the side or over the rear end of the body. Side-loading equipment is so constructed that the track is movable forward and rearward along the body, and the rear-end loading equipment is provided with an adjustable trip for distribution of the load. The bucket, or skip, is hoisted from the ground level to its dumping position over the body by means of cables running over drums driven by a water motor, pressure from which is supplied by means of a small centrifugal pump which is driven by the truck motor.

The bucket travels at approximately one foot per second, being hoisted or lowered to the ground, and will travel to the dumping point and deposit its load into the body automatically and return to the ground in less than one minute. The water motor acts as a brake in lowering the empty bucket to the ground. Shields are provided to prevent odor and dust nuisances, and the equipment is cleanly and fly-proof. The body may be divided into two compartments, one for garbage and the other for ashes. This feature is especially adaptable to small communities where it is desired to collect both ashes and garbage at the same time. When the body is loaded and ready to go to the dump, the side or end track may be drawn in close to the body and fastened.

Lake have decided that it is a good investment and worthy of extension.

New Ash Truck Loader

In the accompanying illustration there is shown an auto-conveyor for loading and hauling garbage and ashes and all kinds of municipal rubbish, which has been developed and placed on the market by George W. Otterson, Springfield, Ohio. This conveyor is a labor-saving device, inasmuch as but two men are required for its full operation, a driver and a laborer, whereas the ordinary methods now in use require from three to



EASY LOADING MAKES THIS ASH AND GARBAGE COLLECTOR

TRUSCON CURB BARS

Protect and Reinforce Concrete Curbs

They provide the best and most economical method of protecting and reinforcing concrete curbing for either business or residential streets. There is no separating or splitting of the concrete at the corners, on account of the open spaces in the anchorage, which is absolutely positive.



Truscon Curb Bars are manufactured from special rolled steel sections, and are heavily galvanized after forming.

They are furnished in either straight or curved bars and provide a protection of $1\frac{5}{8}$ ". Standard lengths, 8, 10 and 12 feet.



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(FORMERLY TRUSSED CONCRETE STEEL CO.)

YOUNGSTOWN, OHIO.

WAREHOUSES AND REPRESENTATIVES IN PRINCIPAL CITIES

ARCADIA TRAILERS SAVE MONEY

in garbage and ash collection in Syracuse, N. Y., and other cities.

Investigate them for your city

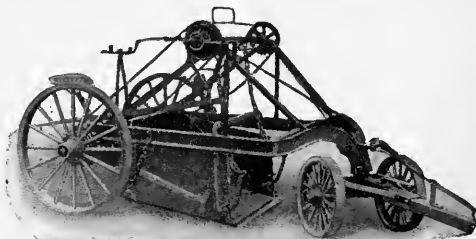


Arcadia low-sided dump trailers are the strongest drop-frame trailers on the market. They are reversible, will track singly or in trains, may be backed and will not sway or cut corners. Can be drawn by either motor trucks, tractors or horses. The Arcadia Body dumps to either side and locks to prevent accidental dumping. The garbage type does not leak and clears itself when dumping.

Valuable for Contractors also.

Full particulars on request

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BAKER MANEY SCRAPERS Self-Loading

For light tractor in half-yard size. For heavy tractor, in full yard capacity. A splendid dirt mover for parks, cemeteries, cities and contractors.

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VOLUME XXIV

NUMBER 4

The American City

NEW YORK

APRIL,

1921

Assets of the Ideal City

Copyright, 1921

By Charles M. Fassett

Former Mayor of Spokane, Wash., Former President, Spokane Chamber of Commerce

EDITORIAL NOTE.—THE AMERICAN CITY congratulates itself and its readers on having secured the magazine rights for advance publication of some of the chapters of Mr. Fassett's forthcoming book on "Assets of the Ideal City." These chapters, the first of which is here published, will appear from time to time in THE AMERICAN CITY during 1921. The book will be published, probably about the end of the year, by the Thomas Y. Crowell Company of New York.

The City's Relation to the State

A CITY cannot be a city without a legalized corporate existence, derived from the next higher political unit, the state. In the exercise of its paramount power, the state either grants the right of organization to the growing urban community, or gives to it the choice of, or imposes upon it, certain ready-made plans of city government which have been approved by the legislature. But when the city is organized, only two states, Oregon and California, allow it to work out its own salvation. In all states the city government is bound by certain fundamental principles of democracy, and a direct relation to the general government, and this is quite proper and essential; but most states go much farther, and hold the city subservient to a continuing tutelage of the state legislature, which hampers and discourages constructive development.

This condition has brought about a reaction in the growing demand for home rule for cities. There is no logical reason why a city should submit its internal problems to a legislative body whose members come largely from rural surroundings, whose sessions are infrequent and short, and whose processes are not conducive to careful study or deliberate action upon the vital problems

of municipal life. Some functions of government, such as deal with health, education and the public peace, may be handled better through the broader authority of the state, but there is every reason for allowing cities the greatest freedom for self-expression consistent with the basic structure of our government. Every state constitution not now granting this freedom should be amended or modified to conform to the provisions now in effect in Oregon and Colorado, which are practically identical to the proposed home rule constitutional amendment promulgated by the National Municipal League in connection with its Model City Charter:

"Such proposed charter shall become the organic law of such city and shall supersede all laws affecting the organization and government of such city which are in conflict therewith."

The City Charter and Its Administration

A city charter and the ordinances based upon it are the tools which, in the hands of the city officials, will make or mar the civic structure. We need not expect good workmanship, even from the best of public servants, unless we provide the best possible tools obtainable. The old notion that all we need to produce good government is

good men in office, is a proven fallacy; we know now that there are three principal factors in good government, viz., good laws, good men, and a continuing interest on the part of the citizens.

Given the proper home rule clause in the state constitution, the city charter and its adequate administration determine the democracy, the efficiency, the economy, the responsiveness of the municipal government. Experience has taught us that some charters tend to discourage and hamper constructive action by city officials, disappoint forward-looking citizenship, and encourage graft and bossism, while others, even with government in the hands of mediocre men, tend to give us better results. We have learned better than to attempt legislation in a city charter, understanding now that the public conscience and the public will are in constant flux, and that as soon as a man or a human document becomes stationary, decay begins.

There are enough well-governed cities in America to-day for our investigation as to form of city governmental structure, so that a charter commission composed of earnest and intelligent citizens properly advised by experienced experts need not go wrong in the selection of a type of government and in the preparation of a charter which, in the hands of competent and honest officials, will give any city a modern, responsive and democratic government, conducive to efficient administration, suited to local conditions, and satisfactory to the best citizenship.

Forms of City Government

The selection of a form of municipal government is a matter of prime importance, and many cities and towns now seek to improve civic conditions by a change. Forms now used in our cities may be classified as follows: town meeting, federal, responsible executive, commission, and city manager. In spite of its claim for pure democracy, the town meeting is, in practice, the least democratic. Taking the Census Bureau's estimate, that 55 per cent of total population consists of adults over 21 years of age, a town of 10,000 population has 5,500 persons capable of citizenship. Few town halls seat more than 1,000. The clerk of the town of Greenfield, Mass., with 15,000 population, reports that measures in the warrant are usually decided by a total vote of 200

or less. This can only mean that 101 persons determine the action of over 8,000 voters, and may easily give rise to evil practices by means of a "packed" town meeting.

The federal form, with a mayor and two branches of the legislative body, occasionally numbering 200 or more, is cumbersome, unresponsive, slow in action, and divides authority. Checks and balances may restrain, but they cannot vitalize government. The responsible executive form, as it prevails in Cleveland, and as it has been adapted to state government in Illinois, Idaho, and Nebraska, depends too much upon a single elected official, and involves too great an upheaval in administrative organization after each election. The commission form is a considerable improvement over the older types. It abolishes national partisan politics in city business, fixes responsibility, and curtails the practice of "passing the buck." Its chief weakness is that it produces a five-headed executive which also constitutes its legislative body, a body too small as a representative assembly and too large for efficient administration.

The city manager form, involving a city council with only policy-forming functions and an expert administrator to do the work, is the latest approved form of city government. It is democratic, responsive, efficient and economical. It involves little change in administrative organization following elections; it tends to make city executives experts instead of amateurs; it allows representative men to sit in city councils without detriment to their private business; and it provides for carrying on the city's business with economy and dispatch. It is, therefore, not acceptable to those elements which are restrained by good government, nor to politicians who live upon office or upon political spoils.

A City Plan Essential

Most American cities have not been built, they have grown without plan. A railroad station, a cross-roads, a river junction, or a waterfall has determined the first location, and from this point the development has proceeded in haphazard fashion, encouraged here by an existing country road, hampered there by some trivial natural obstacle or obstructive land ownership. It is difficult for the pioneer to visualize the city of the future, to realize that the hamlet of to-day is the city of to-morrow, to understand that

the narrow road which is sufficient for the occasional farmer's cart is entirely inadequate for the heavy traffic of a city, to forecast the need of an urban population for parks, playgrounds and open spaces. And even if the vision appears, the means of carrying it out are lacking.

The city planning movement, now very much in evidence in American cities, is a realization of our lack of foresight and an attempt to direct growth and development along sane and useful channels. Its aims are three-fold: to correct as far as may be possible the mistakes made by reason of the absence of a plan in the past; to meet with good judgment the needs of the present; and to prepare for such growth as may be reasonably predicted for the future. In its more recent aspects the city plan is not primarily a "city beautiful" movement; it is an attempt to build a city useful, efficient and livable, a city in which men may work with comfort and convenience and may make their homes amid healthy and wholesome surroundings, homes that are capable of producing the highest type of American citizenship. Such planning no city can afford to neglect or postpone.

Zoning Protects the Common Interests

The right of a citizen to do what he will with his own is gradually yielding to the larger right of the community. Private property in city land is not so sacred as it used to be. We have long recognized the right of the city to condemn privately owned land for public use; some states go further and allow the condemnation of more land than is required for the public improvement, and the resale by the city of the unused portion. Now we are ready to go another step, in saying that the use made of land shall be so regulated that it shall not infringe a neighbor's right of usage, or the common interests of the community. This is zoning, and it is usually made the first step in city planning, after an expert diagnosis of the local conditions and requirements.

Zoning sets aside certain areas for every reasonable use to which land in cities may be put, arranges for facilities to accommodate specific uses, and prevents infringement or trespass of one use upon another. It affects the character of pavements and the height of buildings; it locates manufacturing plants and warehouses in districts

easy of access by railroad sidings and heavily-paved streets; it prevents the location of a stable, garage, or undertaker in a purely residential neighborhood, and provides locations where all sorts of business can thrive without damage to adjoining property. It stabilizes realty values and gives greater permanence to investments in city property. Zoning is the latest expression of the desire to make a city more livable for all its inhabitants by the reasonable application of a wholesome law.

Police and Fire Protection a Prime Duty

The protection of life and property is one of the first obligations of government. A bill of rights or a paper grant of freedom is of little avail unless the citizen may confidently rely upon his local government for his personal safety and for adequate protection of his property. To this end the organization and conduct of the police and fire departments is of great importance. Equipment, personnel, organization and location of stations are the principal factors. Motorized equipment is essential to prompt action and is economical for many reasons. Fewer stations furnish better service where the motor has replaced the horses, and, particularly in a district where calls are infrequent, the economy of a traction which consumes no fuel when inactive, is very marked. With good equipment, personnel and organization largely determine efficiency. It is pitiful to see such vital departments subject to disruption and overthrow with every change of political administration, as is so commonly the case in American cities.

Fire departments are frequently sources of trouble because their men are idle so much of the time that they get to hating themselves and each other. It has been proposed that the city establish shops in connection with every fire station, where the city's equipment for all departments may be renewed and repaired; that firemen be chosen for their mechanical ability as well as their physical fitness for fire-fighting; that they be better paid, and expected to be at work excepting when out on fire alarms. Spokane, Wash., maintains a shop in connection with one fire station, at which automobile apparatus is assembled and repaired, and the products of this shop, as well as the influence of productive labor on the men, have been of remarkable interest and

advantage. Men are just as good firemen, and perhaps better, when, on an alarm, they drop useful tools to fight a fire, as when they lay down a deck of cards.

Centralized Purchasing an Economic Necessity

No city, large or small, can afford to allow each department or foreman to buy supplies independently. If the volume of purchases does not justify a purchasing agent on full time, an official with other work should be designated for this duty. It will follow that the city will buy at lower prices, goods bought will be accounted for, and time will be saved, not only that of city officials and employes, but of the merchants from whom purchases are made. The purchasing agent should be responsible for goods bought, until they are in the hands of the department or the crew which uses them; and all checking of goods received and authorization of payment for them should come through him.

Most modern charters require bids to be submitted and considered in open session of the city council or other official body when the amount of the purchase is of considerable size, making provision for emergencies when the time required for advertising would cause expensive or dangerous delay. This emergency clause is frequently overworked, but if the city is fortunate in having a real purchasing agent, he will usually get as good bids over the telephone as would have been submitted in writing, and no damage is done. Emergency purchasing in the hands of all the officials often leads to dishonest practices and is always wasteful.

The Benefits of a Municipal Testing Laboratory

It has been said that no city of 10,000 inhabitants can afford to be without a testing laboratory; it is certain that any city which buys in large quantities can get better goods at lower prices if it has available the means of determining qualities. Most commodities which a city purchases have qualities which relate closely to their value and which cannot be determined by any casual inspection. The materials of engineering construction, the component parts of bridges, pavements, culverts and other civic improvements, are peculiarly subject to substitution, adulteration and damage in manufacture and transport, and unless they are

carefully tested before they are incorporated into the city's structures, great loss may result. Good labor and skill may be wasted upon worthless material, and resulting structures may not be able to stand the strains which they are confidently expected to bear. The testing laboratory in competent hands determines comparative quality and value with scientific precision. Coal, cement, asphalt, fire hose, lubricants, paints, and like products can be bought on absolute merit by its means.

But only a small part of its benefits can be estimated in money. Its work for the health department is vastly more important, although less showy. The chemical and bacteriological examination of milk and other foods, the analysis of the city's water-supply, the inspection of cultures and smears from suspected communicable diseases—these and the scores of other services which the laboratory may render in the protection of public health and the increase in public sanitation, amply justify its cost, regardless of any money it may save the taxpayers in other matters.

Pensions for Faithful Municipal Service

We safeguard appointments in the public service by adequate civil service laws, but we commonly fail in consideration of what becomes of a faithful employe after his active years of work are past. In this consideration private industry is setting the pace in a movement in which our cities should be leaders. Cities as a rule pay less salaries than private employers pay for like services. In nearly every city department will be found men and women who have served the city long and faithfully, who have been unable, and reasonably so, to provide adequately for the time when they shall no longer be physically fit for the performance of the daily task, and whose only outlook for old age is humiliating dependence. Such a condition is nothing short of shameful. A few cities have realized this failure and have corrected it by adopting a scheme for retirement of civil employes for old age or disability, with a pension sufficient to insure against actual want. Many cities have already established this practice in their police and fire departments, so that its extension to apply to the other workers in the civil service will be only an enlargement of scope, and one which every enlightened community will support.

The Importance of an Easily Understood Accounting System

We keep books of record because we want to know the condition of our business. It follows, therefore, that the best system of accounting is that which will most readily and completely answer our questions regarding the state of our affairs from time to time. Not that we as citizens pay much attention to our public business, but the books must show to the occasional enquirer the financial condition of the city in sufficient detail and segregation to enable him to form some judgment as to its general solvency, the present condition of its departments and municipal undertakings, its revenue and expenditures and its financial obligations, and to give him the basis for such comparisons as may illustrate its efficiency or its incapacity, as the case may be.

For such comparisons cost accounting in public work is indispensable, and yet we find few cities which use it, and where it has been adopted, it has usually come by means of outside pressure. The manager of every public utility which the city owns and operates should be able to show by its books its condition and the cost, scope and financial results of its operations, not only for his own guidance, but in order to inform its stockholders, the citizens, of its service and its prospects.

Most states have provided uniform methods of accounting for their political subdivisions and exercise some sort of accounting supervision over them, but it is a civic duty to see that the accounting system is adequate, without the compulsion of any superior authority. If the system used is so complicated as to be understandable only by an expert, which is a common tendency, there should be a summary made of each

balance sheet in simple terms, easily intelligible to any inquiring citizen.

The Budget System Aids in Preventing Waste

No prudent man decides upon an important expenditure without first considering his income and his other uses for money. Like consideration is more imperative in public affairs for the reason that city governments are not restricted to their earnings, but are endowed with the power to tax the earnings of every citizen. I may, if I choose, waste my money in profligacy, but the city's money must bring something of value for every dollar spent. To avoid public waste, and to determine tax levies, the city must know what its expenditures are to be a year or more in advance. Its citizens who are to be taxed have a right to know what their officials propose to spend and for what purpose. Hence the necessity for a budget.

In ample time before the close of the city's fiscal year the estimates of the various department heads, made in considerable detail, are collected and incorporated into a general statement which shows, in separate columns, expenditures for the same purpose during the preceding year, appropriation for the present year, amount of the present year's appropriation expended to date, and the amount requested for the coming year. This statement enables the tax-levying authority and interested citizens to make those fruitful comparisons by which civic policies may be intelligently determined. The budget system, while only a part of efficient governmental practice, is a very important part. Many cities now use it, and hopeful citizens visualize the time when it will be used in our states and national government.

Group Health Insurance for School Workers

According to information received from James H. Naylor, District Chairman, the South Hartford, Conn., School District has taken out a group health insurance policy on the Superintendent, principals, teachers, office help and janitors of the district. The policy costs about \$4,000, being based upon the annual salary expenditure of \$360,000. It calls for a reimbursement of 50 per cent of the salary for time lost through sickness

for any period between one day and thirteen consecutive weeks. Illnesses reported are carefully checked, a doctor's certificate being required in every instance. Each case is investigated by a representative of the underwriters.

After a trial of nearly a year, the plan is regarded as perfectly satisfactory, and the school committee has no hesitation in recommending it.

The Municipal Swimming Pool, Montgomery, Alabama

By H. A. Washington
City Engineer

IT has been the aim of the Board of Commissioners of Montgomery, Ala., to develop rationally the parks of the city and provide suitable playground equipment. In addition, a Supervisor of Play has been appointed to guide the children in their play and group games. Among other things authorized by the Board of Commissioners, which took office in October, 1920, was the construction of a suitable swimming pool and bath-house. The writer was instructed to prepare plans and specifications and to

with Stone-Tex.

The water for the pool is supplied through a 4-inch pipe connected with one of the city water-mains, and is emptied through an 8-inch pipe connecting with one of the city's outfall sewers. In order to meet all sanitary regulations, the pool is emptied every night and thoroughly washed and refilled before morning. As a further precaution, an automatic chlorinator has been installed to insure complete sterilization of all water entering the pool.



VIEW OF THE MUNICIPAL SWIMMING POOL, MONTGOMERY, ALA., SHOWING BATH-HOUSE AND BLEACHERS FOR SPECTATORS

award contracts. The pool proper, which is shown in the accompanying illustration, was built of reinforced concrete of 1:2:4 mix, waterproofed with Truscon waterproofing compound and painted with Stone-Tex. The pool was made 120 feet long, 50 feet wide and 2½ feet deep at the shallow end and 8 feet at the deeper end. A commodious bath-house has been built, modern and up-to-date in every detail, covered on the outside with cement mortar and painted

Only the nominal sum of 10 cents is charged for the bathing privileges and the use of the pool, but even with this low charge for admission more than enough is realized to pay the operating expenses. The bathing hours are from 6 in the morning to 11 at night, and the average daily attendance is close to 1,000. The pool is provided with the usual accessories, such as a diving tower and a springboard, and bleachers are provided for spectators.

Why an Intensive Study Should Be Made of the Subgrade for Roads

By H. G. Shirley

Secretary, Federal Highway Council, Washington, D. C.

THE necessity for an intensive study of the subgrade for roads was not as pressing in the past as it is at the present time and will be in the future, because traffic units had not increased to such a weight that the crust of the highways was destroyed, and therefore a fairly thin surfacing would render quite efficient and lengthy service. Even then surfaces were not designed so as to carry the maximum wheel load over the entire section, but were of a uniform thickness rather than a uniform strength—some places entirely too thick and others entirely too thin.

The writer does not attempt to justify the use of the heavy truck, and does not acquiesce in the charge that the destruction caused by the heavy loads can be attributed more to the improper construction of the road than the weight of the load, but rather, he believes that the heavy load is one of the prime factors in destroying many of the surfacings of the highways that have heretofore been constructed, and that therefore some limit as to its weight and the speed of the vehicle should be arrived at and agreed upon as soon as possible. The economic hauling unit should be one that will preserve the road-bed and yet be an efficient unit to operate. The subgrade problem is just as important from the standpoint of a 3-ton truck as it is from the standpoint of a 7-ton truck, because it is purely a problem of proper design, and one that will have to be solved before any intelligent design of the surfacing can be arrived at.

When one reads of the adoption of a standard specification calling for a uniform thickness over all classes of soil, he cannot but feel that there is something radically wrong in the adoption of any such standard, and if it is persisted in there will be written some of the blackest pages ever recorded in engineering history.

The crying need at the present time is to build a road that will have a uniform strength, so as to carry a specific load over its entire length without danger to its structure. On gravel and other stable soils



CONCRETE ROAD, 8 INCHES AT CENTER AND 6 INCHES AT SIDE, SHOWING ACTION OF FROZEN SUBGRADE

with high bearing power, a thick surfacing is not required; whereas on soils consisting of clay and adobe a very much thicker surfacing is needed to carry the same load at certain seasons of the year. Why, then, should we persist in laying the same thickness of surfacing over the clay and adobe soils that we lay over gravel and other more stable materials. Millions are being wasted annually in using in some places a greater thickness of material than is needed, and in not putting down a sufficient depth in other places. The consequence is that in the places where there is not a sufficient depth of material the surfacing will go to pieces under the load, thereby causing an enormous expense for its reconstruction.

The Percentage of Failures

It may be of interest at this point to note that the failures that occur on soils of high



BRICK ROAD ON 6-INCH CONCRETE BASE OVER CLAY SUBGRADE, RUINED BY FROST ACTION

bearing power run about 17 per cent; whereas under the same climatic and traffic conditions, with the same thickness of surfacing, made of identically the same materials, on soils of low bearing power, such as clay and adobe, the failures run up to 70 per cent. On stable gravel and sandy soils the failures run down as low as 2 to 3 per cent, and they are very likely due to workmanship and not to foundations.

From this it can be seen that the uniform distribution of the material over the subgrade was an absolute mistake. In sections it could have been made thinner, and over the weak clay and adobe sections it should have been made thicker. Of course this would not have shown up if heavy traffic had not gone over these highways, for we all realize that almost any kind of surfacing would be capable of carrying a large volume of baby-carriage traffic. If the highway is to be built to serve the community, and be a means for transportation, it must be built of sufficient strength to carry economically the commerce of the section it serves.

The Problems of To-day

The two most important problems of highway transportation and construction that

face the country at the present time are the determination of the weight of the moving load that can be carried, and the bearing power of the different types of soils of the subgrade. When these two factors have been determined, plus a reasonable percentage for impact due to speed, we can proceed to design the surfacing with a reasonable assurance that it will carry the load that has been specified without breaking down in many places and costing the public a large amount of money to repair annually.

Thomas H. MacDonald, Chief of the Bureau of Public Roads, and Mr. Goldbeck, Testing Engineer, fully appreciate the great importance of this problem, and are devoting a great deal of energy and time to its solution. The Bureau has under investigation many important features bearing on this subject and is doing most excellent work. It is only through such a channel that highway officials can look for this problem to be solved quickly, and it is the duty of those interested in highway construction and highway transportation, and of the general public, to assist this investigation in every way and to see that the Bureau of Roads is supplied with sufficient funds to carry on this work expeditiously. The Subgrade Committee of the Federal Highway Council is coöperating to the extent of its ability with the Bureau of Roads and the leading universities and colleges of the country, as well as many of the state highway departments and testing laboratories, in an effort to stir up as much interest as possible on this subject. By working together the problem can be approached from many angles and a most satisfactory solution arrived at speedily.

The outline of the problems being taken up by the Problem Committee of the Council are as follows:

Problem 1. Securing of samples of the subgrade materials at points where the failures have occurred, and samples where failures have not occurred in the same vicinity under similar conditions

Problem 2. Developing field tests for bearing power of soils

Problem 3. Making studies in drainage, using experimental sections of roads

Problem 4. A study of chemical methods of subgrade treatment for increasing bearing value or preventing absorption

Problem 5. A study of mechanical methods of subgrade treatment

Problem 6. A study of the effect of freezing and thawing on the volume and on the supporting properties of soils

Problem 7. A study of the effect of moisture on the volume changes in soils

Problem 8. A study of the transmission of pressure transmitted to the subgrade, through different thicknesses and different types of surfacing

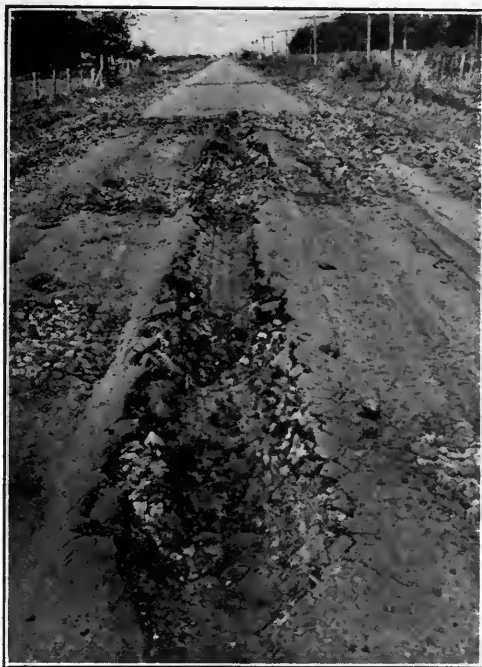
Problem 9. A study to ascertain the practical classifications of subgrade materials

Problem 10. Special problems

How to Sample the Subgrade

The samples taken should be a cubic foot in volume and taken directly under the failure, if possible. The accompanying data should give the general topography of the surrounding sections, drainage conditions, type and character of workmanship used in building the roadway, photographs of the failure, and the general conditions surrounding, as well as full description of the traffic passing over the road. Samples are also to be taken in the near vicinity, under similar conditions, from a section of the road that has withstood traffic, with all the accompanying data given as above. These samples will be tested to determine their behavior and bearing value under many conditions: first, the amount of water contained in the soil when samples are taken, also the volume of water when it has been saturated, and the change in volume due to the varying amounts of water; change in volume due to freezing and thawing; void spaces in the soil; the rate and extent of percolation through the soil; the rate and extent of capillarity, both horizontal and vertical; organic matter in the soil, and its bearing power under the different quantities of water; its analysis as to fineness and its classification. These along with many other characteristics of the soils are being studied and determined.

The intricate classifications of soils and their behavior under heat, cold and moisture seem to have a deterring effect and to be very discouraging to many, but the complications and unknown quantities that will have to be met make the work only that much more interesting. It is felt that when the problem has once been solved the conclusions will be thoroughly worked out for all time to come. With the experiments being carried on by the Bureau of Roads, the different universities and laboratories of the country, we can feel assured that an improvement in the subgrade conditions will



BITUMINOUS MACADAM ROAD SHOWING DESTRUCTION DUE TO WET SUBGRADE

be arrived at in the very near future, and that it will not be many years before a really satisfactory solution will be found—one that can be used with economy, and with assurance that a road constructed in accordance therewith will support the load specified, and the bearing power of the subgrade will be no longer an unknown factor.

It is hoped that the time will soon come when some simple test will determine the bearing power of the soil, and an inspector can look on his blue-prints and tell the type and character of surfacing that should be used on that particular kind of soil; or that he will be able to turn to his specifications and see the treatment necessary to bring the soil up to a certain bearing power. He will then know immediately how to proceed with the construction of the road in order that it may have a uniform strength throughout its entire length at all seasons of the year and be capable of carrying a specified load without danger of destruction.

ACKNOWLEDGMENT.—From a paper presented at the annual convention of the American Road Builders' Association, Chicago, Ill.

Municipal Forests in the United States

Areas of Watershed, Park and Strictly Forest Tracts Listed

RECENT articles in this magazine and in others devoted to the public interests have discussed the advantages of municipally owned woodlots, but there exists no agency in the United States for keeping record of municipal forest holdings

or serving as an exchange for information on this subject. The following list is published largely with the hope that it may help to stimulate interest in the subject by showing that the movement is by no means small or insignificant.

State	Municipality	Type of Area	Acres	Remarks
ALABAMA	Florence	Park	About 50	
	Huntsville	Park	About 50	
	Mobile	Park	About 50	
	Montgomery	Park	About 50	
	Selma	Park	About 50	
CALIFORNIA	Glendale	Park	5	
	Los Angeles	Forest		
	San Diego	Forest	7,000	
COLORADO	Boulder	Forest		
	Canon City	Forest		
	Colorado Springs	Forest	17,000	Planting conducted in cooperation with U. S. Forest Service
	Denver	Forest	7,000	
	Durango	Forest	3,000	
	Montrose	Forest	580	
	Pitkin	Forest	80	
CONNECTICUT	Arickeree Creek	Forest	160	
	Bethel	Watershed	125	
	Bridgeport	Park	50	
	Danbury	Watershed	75	
	Hartford	Watershed	413	
		Park	4,345	
	Meriden	Forest	1,000	
	Middletown	Watershed	684	
	New Britain	Watershed	2,713	
	New Haven	Park	550	
		Watershed	9,000	Considerable forest landscape work
	Norwich	Watershed	369	Owued by water company
	Wallingford	Watershed	479	
	Waterbury	Park	1,000	
		Watershed	70	
	Winsted	Watershed	250	
DIST. OF COLUMBIA	Washington	Park		Forest landscape work
ILLINOIS	Chicago	Forest	18,000	Revenue from dead timber
				Forest nursery
	Naperville	Park	3	Professional forester
KANSAS	Leavenworth	Park	3	Controlled by Cook County Comm.
KENTUCKY	Richmond	Forest		
	Paducah	Park	105	
MAINE	Augusta	Forest		
	Brunswick	Forest		For timber production
MARYLAND	Baltimore	Watershed	300	
	Cumberland	Forest		
	Frederick	Watershed	1,250	
MASSACHUSETTS	Hagerstown	Forest		
	Amesbury	Forest		
	Andover	Forest		
	Arlington	Forest	36	
		Park	15	
	Boston	Watershed	1,000	
	Brookline	Watershed		
		Forest	35	
	Cambridge	Forest	400	
	Fall River	Watershed	3,000	
	Fitchburg	Watershed	600	
		Forest	105	
	Gardner	Forest		
	Greenfield	Forest	100	
		Park	75	
	Holyoke	Watershed	2,000	

State	Municipality	Type of Area	Acres	Remarks
MASSACHUSETTS	Lynn	Park	1,000	
	Mansfield	Forest		
	Melrose	Park	125	
	Milford	Watershed	160	
	Needham	Watershed		
	New Bedford	Watershed	2,000	
		Park	82	
	Newburyport	Forest		
	Newton	Watershed		
	North Adams	Watershed	800	
	Northampton	Watershed	1,000	
	Pittsfield	Watershed	1,500	
	Sharon	Forest		
	Springfield	Watershed		1,000,000 white pine seedlings
		Park	1,000	
	Walpole	Forest	150	
MICHIGAN	Waltham	Park	465	
	Westfield	Watershed	1,200	
	Winchendon	Forest		
	Battle Creek	Park		
	Detroit	Park		
	Grand Haven	Forest		Managed by County Agricultural Agent, who has charge of small municipal nursery. For protection against shifting sand along lake shore
	Grand Rapids	Park	120	
	Jackson	Park		
	Lansing	Park	84	
	Saginaw	Park		
MINNESOTA	St. Paul	Park	1,482	
		Forest	35	
		Watershed	800	40,000 trees planted each year
MONTANA	Helena	Forest	900	
NEBRASKA	York	Forest	42	
NEW HAMPSHIRE	Concord	Forest	400	
	Easton	Forest	100	
	Franklin	Park	155	
	Gilsum	Forest	76	
	Hanover & Dartmouth			
	College	Forest	1,000	
	Hollis	Forest	198	
	Jaffrey	Forest	500	
	Keene	Watershed		
		and	1,800	
		Forest		
	Littleton	Forest	40	
	Manchester	Forest	1,800	
	Milan	Forest	100	
	Nashua	Forest	50	
	Newbury	Forest	250	
	Newington	Forest	200	Recently cut and sold timber for \$2,000
	Richmond	Forest	100	
NEW JERSEY	Atlantic City	Forest	2,000	
	Bridgeton	Park	500	
	East Orange	Forest	800	
	Essex County	Forest	3,365	
	Jersey City	Forest		
	Mays Landing	Forest	2,000	
	Millville	Forest	3,000	
	Newark	Watershed	20,480	
NEW YORK		Park	2,800	
	Binghamton	Forest		
	Canajoharie	Forest		
	Carthage	Forest		
	Cooperstown	Forest	10	
	Cortland	Forest		
	De Ruyter	Forest		
	Dunkirk	Forest		
	Elmira	Forest		
	Fort Edward	Forest		
	Glens Falls	Forest		
	Gloversville	Forest		
	Hornell	Forest	25	
	Hudson Falls	Forest		
	Ilion	Forest		
	Johnstown	Forest		
	Lowville	Forest		
	Malone	Forest	40	Recently planted 45,000 trees
	Mamaroneck	Forest		
	Middletown	Forest		
	New Berlin	Forest		
	Newburgh	Forest		

State	Municipality	Type of Area	Acres	Remarks
NEW YORK	New York City	Forest and Park		
	Norwich	Forest		
	Ogdensburg	Forest		
	Oneonta	Forest		
	Ossining	Forest		
	Peekskill	Watershed		
	Pine	Forest		
	Port Jervis	Forest		
	Port Leyden	Forest		
	Rochester	Watershed	10	
	Salamanca	Forest		
	Saugerties	Forest		
	Schaghticoke	Forest		
	Schenevus	Watershed		Recently planted 30,000 trees
	Sherburne	Watershed	95	
	Sidney	Forest		
	Sinclairville	Forest		
	Southampton	Forest		
	St. Johnsville	Forest	40	
	Syracuse	Watershed	150	
	Troy	Forest		
	Unadilla	Forest		
	Utica	Forest		
	Watertown	Forest	15	
		Park	10	
	Waterville	Forest		
	Wellsville	Forest		
	Yonkers	Watershed		
NORTH CAROLINA	Asheville	Forest	1,700	
	Beeward	Forest	216	
	Bryson City	Forest	196	
	Canton	Forest	220	
	Lenoir	Forest	240	
	Marion	Forest	628	
	Mt. Airy	Forest	500	
	Murphy	Forest	600	
	Saluda	Forest	130	
	Tryon	Forest	661	
	Waynesville	Forest	900	
	Weaверville	Forest	330	
	Winston	Forest	600	
OHIO	Cincinnati	Forest	1,500	Extensive reclamation
	Cleveland	Park	100	
	Dayton	Forest	7,000	part of flood protection plan
	Oberlin	Watershed	110	
OKLAHOMA	Caldwell	Forest		
OREGON	Portland	Watershed		
PENNSYLVANIA	Altoona	Watershed		
	Clearfield	Watershed		
	Dubois	Forest		
	Easton	Watershed	1,100	
	Ebensburg	Watershed		
	Harrisburg	Forest		
	Johnstown	Park	105	
		Watershed		
	Ligonier	Forest		
	Lock Haven	Watershed		
	Reading	Watershed		
	Sellersville	Watershed		
RHODE ISLAND	Woonsocket	Watershed	104	
TEXAS	Jacksonville	Forest	10	
		Park	15	
UTAH	Manti	Forest	1,000	
	Ogden	Forest	2,155	
	Salt Lake City	Forest	25,000	
VERMONT	Barre	Watershed		
	Bellows Falls	Watershed		
	Montpelier	Watershed		
	Rutland	Forest		
	South Royalton	Watershed		
	Springfield	Watershed		
VIRGINIA	Lynchburg	Watershed	7,000	
	Roanoke	Forest	2,000	
	Staunton	Watershed	4,000	
WASHINGTON	Seattle	Forest		
	Tacoma	Forest		

Fairhope—A Town-Planning Scheme for Its Development into an Organic City

By C. Montoliu

Secretary of the Hispano-American Garden Cities and Town Planning Association

EDITORIAL NOTE. Although the town of Fairhope is small in population, it is of considerable interest because of the economic theory on which it was founded, namely, the single tax. As the commercial and industrial life of the town expands, it is particularly appropriate that the city itself should grow along ideal lines. The plan has been proposed while the location is still undeveloped, which fact offers exceptional opportunities for the demonstration of correct principles of town building.

FAIRHOPE is the oldest of the five single tax enclaves in the United States. It was founded in 1894 on the eastern shore of Mobile Bay, by colonists representing many states of the Union, and all resolute supporters of the single tax idea. The determining factor in the choice of a location, besides the good agricultural conditions, was the cheapness of the land. The first purchase of 135 acres was made at the rate of \$6 per acre. As the experiment progressed, more land was added, until the present holdings amount to nearly 4,000 acres. An average of 1,500, of which nearly one thousand is permanent, is the present population of the colony.

The colony is incorporated as the "Fairhope Single Tax Corporation." Without power of taxation, the corporation leases its lands for 99 years, collects full annual site-and-use value as rent, and from this rent pays all taxes, not only upon the land, but also on improvements and personal property of the leaseholders, devoting any remaining balances to public services. The colony and municipality own the water-works, light and power plant, telephone and street railway line, bath-houses, wharf and public library. In addition to the "School of Organic Education" founded by Mrs. M. L. Johnson, there is an excellent public school, which follows a unique system of instruction from the kindergarten to the high school, and is free to Fairhope pupils. Its remarkable achievements in the pedagogical field, following the suggestions of such advanced leaders in the American school reform movement as John Dewey and C. Hanford Henderson, have, in part, inspired this scheme for the building there of a model city founded on the same organic principles.

The continuous growth and prosperity of Fairhope have emphasized the need of plan-

ning thoroughly for the future, while the nature of the community has made it an especially promising field for the development of the most modern ideas in the construction of better cities.

General Principles of the Development

The single tax enclaves compare in many respects with the garden city movement in England. There is growing the same conviction that the unlimited growth of cities is civically undesirable; a figure of 50,000 people may be held on the average to be the maximum theoretical limit to be allowed. When the population reaches this figure, any further increase may be better provided for by means of a system of satellite cities, scattered around the metropolis like a cluster of smaller but self-contained urban nuclei, each one separated from the rest by a proportionate rural belt. The said rural belt, of at least double area, forever to be preserved around each urban nucleus, has been devised in order to secure the harmonious development of the industrial and the agricultural activities of the city, whose full interchange of productions will provide the maximum economical freedom and welfare for the community. In so far as the agricultural development of the Fairhope colony is concerned, the writer is well aware of the great confidence with which it can contemplate any future contingencies, if a convenient frontier be marked between the urban and agricultural districts.

Supposing the urban section to be restricted to the limits of the present town planning project, which covers an approximate area of 1,000 acres, its residential portion of about 400 acres in building area (streets not included) gives full space for 24,000 population, at the maximum standard rate of 12 single-family houses per acre,

leaving the rest of the colony land, to the extent of nearly 3,000 acres, as an ample reservation for the permanent rural belt. Allowing for some 3,000 more people living in the industrial zones and in the rural building sections of the forest reservation, and some 5,000 more people living in the farms of the rural belt, we reach the figure of 32,000 as the maximum growth for the future city.

It is needless to say that the most recent developments of civic science, with its architectural, engineering and sociological branches, could hardly have been considered by the courageous founders of Fairhope. The present "Plan for the Subdivision of Land," being rather a surveyor's work, is, at any rate, not worse than the hundreds of similar simple and businesslike subdivision plans that have always been made for colonial purposes, and have unfortunately furnished the mold for the development of so many American cities whose flagrant blunders modern city-planners are at present striving, with prodigious exertion and at enormous cost, to correct.

Luckily enough, the small urban development of the Fairhope Colony up to the present time renders it easy to carry out the reforms suggested in this town planning project. Yet, even under such favorable circumstances, the present work of town planning is also limited in so far as, by lack of sufficient opportunity, there has been left out of its scope all the rural belt of colony land, and in so far as, even in the limited urban area of the actual settlement, the town planning provisions are handicapped by the necessity of respecting the existing private constructions and betterments, made under the actual subdivision plan. Subject to the above-mentioned restrictions, the submitted plan is, however, sufficiently comprehensive to include in its essential outlines all the different aspects of the town planning problem.

Lines of Communications

The first essential for controlling a city's development is to discover the best system of communication with the outside world. The lack of transportation facilities in Fairhope has considerably hindered its substantial growth. This condition is likely to be soon improved, if the expectations of the good roads policy of Alabama are fulfilled; for a good road between Fairhope and

Robertsdale on the L. & N. R.R. would permit the laying out of a trolley or a truck line between these places. Possibly the Fairhope "People's Railway" (an urban line at present between the boat pier and the center of the town), or some other such enterprise, might extend this means of transportation up to Robertsdale. These alternatives are provided for in the plan: the supposed railway is carried through the outskirts of the city to its natural terminal in a proposed commercial wharf on Mobile Bay; and the trolley line is admitted through the main street, Fairhope Avenue, to serve as an urban car line down to the actual pier.

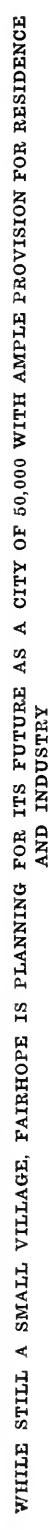
As to water communication, the plan makes large provision for the future. Anticipating an active industrial life, the plan provides a new large terminal station, in front of a solid masonry wharf, with a system of docks and all the necessary equipment for a busy railroad terminal. The use of such a wharf for high sea transportation depends on the channel that could be easily dredged to meet the existing channel connecting the port of Mobile with the Gulf of Mexico.

Zoning

After providing for the transportation needs, the first concern is the zoning problem—to divide the land in the way most favorable for each kind of civic activity. The zoning scheme of the present plan provides for four different zones or districts, as required by the industrial, the commercial, the residential, and the recreational needs of the city.

The industrial section comprises two separate areas, marked in cross-lines on the plan. Although both are subject to the same rules, the Industrial Zone East is designed for those industries that do not require a water-front and need only land transportation, and the Industrial Zone West, for all other industries. Without entering into details of the building regulations, it can be stated that in those zones any kind of buildings should be permitted in conformity with those regulations.

The Commercial Zone (marked black) is properly speaking, the store, shopping and office section of the city. It is very desirable that all such structures should be as close together as possible. Their concen-



tration tends to determine the center of activity of any city. In the present case we have only to acknowledge and emphasize the spontaneous popular verdict in confining practically all the stores of the colony to the west section of Fairhope Avenue. With the exception of dangerous, smoky and noisy machinery, and any similar nuisances, all kinds of structures should be permitted in this zone specially reserved for a compact building system.

The recreational and hygienic needs of the community have been provided for by the park system (dotted area), designed to be the forest reservation of the city. This sylvan zone, appearing as a green girde around the main urban nucleus of the town, contains different parts and responds to different uses, its chief aim being to save from the future growth of the building area the natural features of the country and the hygienic resources of its forests. In a general way, all the park system area answers to these needs, but in particular, the large part that is designed for real parks, as marked in the plan. This green reservation may give convenient and more or less permanent location to several other concerns of like purposes, as the cemetery and the golf course. A park drive along the beach side of the green girde, and in connection with a system of avenues specially devised to enhance its unsurpassed natural beauties, would probably be one of the favorite resorts of the colony. Inasmuch as the wild but smiling ravines of the so-called "gulleys" form the dominant feature of the Fairhope landscape, the author has been led to take the contour of the two that cross the town area as the base of his park system's design, which finds its natural crown in the bayside, where both gulleys terminate.

A special reservation ought to be made in this zone for a school of agriculture, an institution very much in keeping with the character of the colony, for whose general progress it would prove a powerful instrument. A complementary feature of the submitted park system is the several wood screens devised for the convenient protection of the residence sections from the smoke and the unsightly nuisances of the adjacent industrial zones.

In congested quarters, public squares perform, on a small scale, certain of the functions belonging to parks. In the submitted

plan, it has been deemed necessary to remedy the absolute lack of public squares in the present Fairhope street system with the provision for two large open spaces: one in the west residential quarter, likely to become congested with the development of the proposed harbor and terminal facilities; and the other in the main residential quarter as the required civic center of the town.

After making due reservations for the industrial, the commercial, and the recreational needs of the community, all the rest of the town area is to be devoted to its main residential purpose by making it a place worth living in. Accordingly, all the rest of the plan is occupied by the residential section, divided into three residential zones. The Central Zone, marked C, occupies the main central town area (with the exception of the commercial and civic centers), inside the park system circuit, as the most attractive and valuable residential district of Fairhope. Marked E and W, east and west of the central section, and outside its park surroundings, two other residential quarters are specially designed to provide for homes for the employes of the east and west industrial zones. In all the sections of the residential zone, allowing for a certain variety with regard to the special use of each one, the detached and the single-family house system, with convenient space for private gardens, ought to be prescribed by the building regulations.

Street System—Public Squares

The preëxistence of an inorganic street system, as before stated, has limited our task to the marking of only the most essential changes required by our organic conception. But an important question ought to be put regarding the desirability of a study of the existing and projected streets in order to readjust their respective widths to a general classification of streets and thoroughfares, the thoroughfares being the roads designed to serve a through commercial traffic, and the rest, called simply streets, to be used as mere connecting links between the residences and the thoroughfares. A considerable reduction in the cost of street construction, not to speak of such social advantages as the greater quietness and freedom of family life, would thus be obtained.

But the most positive of the reforms embraced in this section is that regarding the

public squares or open public spaces inside the surrounding park system. This subject forms an important part of the street system problem. The first open space, designed to relieve the probable congestion of the west industrial and residential zones, may most effectively meet this demand by being developed in the form of a public playground square. But, keeping in mind the eventual need of a wholesale market in the proximity of the main freight station, with the anticipated development of the fruit and truck packing industry in the adjacent industrial zone, we suggest a possible alternative use of the same public square as a public market. Its large extent gives room enough for both purposes.

The Civic Center

By far the most important feature of the present division and, in the deeper sense, the very marrow of our organic system, is the large open space provided in the center of the town as a site for an adequate organ of the civic spirit or the public life of the whole community. The end of the business district at the point where the main commercial avenue crosses the intellectual center or academic forum, represented by the Organic School premises, marks the rational location of this central power agent of the organic system. Structurally designed as a large public square sufficient for the needs of the public life of the anticipated population, the projected public forum, besides offering a central and dignified meeting-ground for all open-air public gatherings, will give in its central part ample room for the erection of the public service buildings required by the civic life of the community. Either all gathered in a single monumental People's House, or placed as an artistic group of particular buildings, here, as suggested in the plan, fitting place may be reserved for the City Hall, the Public Library, the Post Office, the Chamber of Commerce, the City Club, and other public service constructions.

It is not without reason that from Greek and Roman times the public life of the citizens has shown a tendency to center about

the market-place. Although lately both organs, the market and the forum, have been differentiated, their natural relation makes desirable the practical connection of their respective sites. Consequently, the civic center in our plan is divided by the public building area into two different squares—the southern designed for the real civic center or forum, and the northern for the market. At all events, the necessity for the latter is obvious. The temperate climate that Fairhope enjoys all the year long is the best inducement to try the adoption of an institution so popular in most of the European towns, and which, as a municipal service, is an important source of revenue to the city funds. For convenient shelter on rainy or unfavorable weather a portico all along the building line of the square could be constructed in the usual Spanish or Latin-American style of such charming appearance.

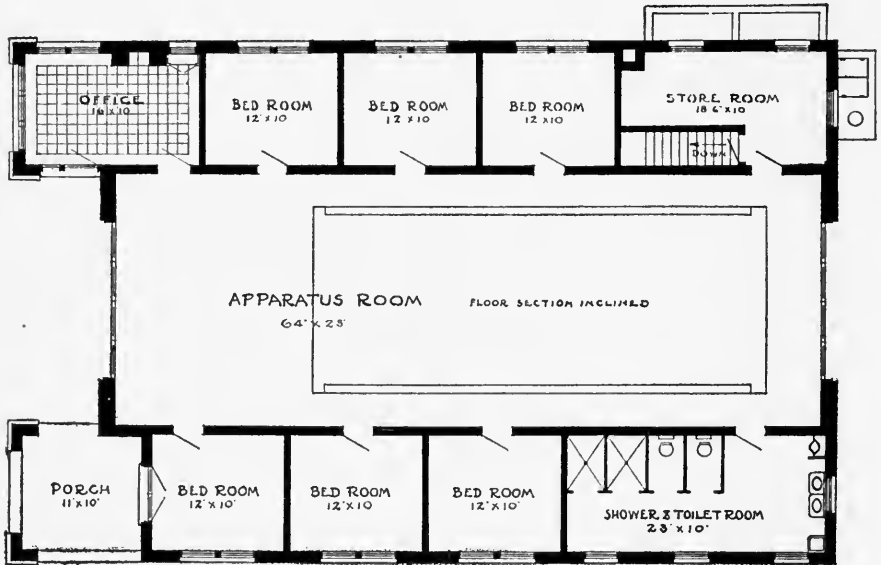
At the east side of the public buildings reservation, and in anticipation of more room required in the future for the public service buildings or equipment of the civic center, a large lot of land is marked for a convenient extension, which ought to be reserved immediately, and which could find meanwhile fit use as a playground connected with the Community Club.

This Community Club should certainly become one of the principal features of the civic center, as being an institute specially designed to stimulate and promote the civic life of the community in all its multiform expressions. Very fortunate for this purpose has been the recent erection of the "Comings Auditorium" at the northwest corner of the Organic School campus, exactly fronting on the north side, the proposed public playground of the civic center, and on the west side, the civic center itself. Assuming that it would be very easy to adapt the new auditorium to the immediate needs of the Community Club service, its erection in this very place offers an opportunity to invest the building with the symbolical attributes of a worthy connecting link between the Organic School and the civic center.

Attractive Small Fire Station, Memphis, Tennessee

FIRE STATION NO. 15, Memphis, Tenn., designed by Regan & Weller, architects, and depicted below, strikes a new note in simplicity of construction and thoroughness of detail which provides for the comfort and efficiency of the fire

company. It furnishes a clean, comfortable place in which to live and makes an efficient fire station in which the care of the apparatus can be readily and effectively carried on. It will be noted that there are six separate bedrooms.



Illustrations courtesy of American-La France Fire Engine Co.

FLOOR PLANS AND FRONT FACADES OF FIRE STATION NO. 15, MEMPHIS, TENN.

Steam Turbines for Municipal Power Plants*

By W. F. Schaphorst, M. E.

EDITORIAL NOTE:—It is hoped that the series of articles of which this is the first may be found useful by municipal officials as a guide to the better understanding and correlation of municipal power-plant equipment. Many officials are not familiar with power-plant apparatus and terms, and do not know how to proceed in order to come to a decision. There is no book in print that clearly sets forth comparisons, that gives efficiencies of different types of apparatus used in the municipal power-plant field. It is with this in view that THE AMERICAN CITY has had this series of articles prepared for municipal officials.

STEAM turbines are divided into two main classes—"impulse" turbines and "reaction" turbines, depending upon the method used in converting the energy in the steam into mechanical energy. In addition to "impulse" and "reaction" we frequently meet with such expressions as "pressure stage turbines," "velocity stage turbines," "axial flow turbines," "radial flow turbines," and "tangential flow turbines."

It is not necessary, however, that the purchaser know all about the theory of steam turbines, nor is it necessary to know the exact meaning of all the above terms. What the city official wants is the turbine that will deliver the most power per dollar invested, most dependably, and for the greatest length of time. Few owners of automobiles, for instance, understand the theory of the automobile, but they do know the meaning of first cost and ultimate economy.

The steam turbine, according to history, was invented long before the steam engine, but, until comparatively recent years it was not considered practical as a prime mover. It is much simpler than the steam engine, containing only one principal moving part—the rotor, which consists of one or more discs, wheels, or drums carrying buckets or blades. Steam jets, at very high velocity, then impinge against these blades or buckets and cause the rotor to rotate. In other words, the rotor of a steam turbine is moved around by steam, much like the windmill which is caused to turn by moving air. The difference is, wind velocity is seldom greater than 90 miles per hour, whereas the steam velocity in the steam turbine frequently surpasses 1,800 miles per hour.

Many Advantages

The steam turbine has many advantages over other prime movers, among which are:

1. *Few moving parts.*—There is only one large moving part—the rotor.

2. *Very little wear.*—The rotor is usually supported on only two bearings, consequently all of the mechanical wear takes place in these two bearings, and is so slight that it can be called practically nothing. Besides, bearings are easily re-babbitted or repaired after they are worn.

3. *No heavy reciprocating parts.*—The motion of the rotor is always in one direction and is purely rotary. The steam turbine, therefore, takes the place of the long-sought rotary engine which no one has as yet been able to perfect. The so-called "rotary engine," in its usual design, contains a rotating piston behind which it is attempted to expand steam economically. A steam turbine uses rotating blades against which high-velocity steam impinges, the velocity energy, or kinetic energy, of the steam thus being converted into work. It is usually claimed by "inventors" of rotary engines that steam turbines do not utilize the expansive properties of steam. The fact is, steam turbines utilize the expansive properties more perfectly than any other heat engine.

4. *No vibration.*—Elimination of reciprocating parts reduces vibration to almost nothing as compared with the vibrations that accompany reciprocating engines.

5. *Lighter foundations.*—Elimination of vibration eliminates heavy foundations.

6. *Smaller floor space.*—Steam turbines operate at much higher speeds than steam engines, and consequently much less space is required. Roughly, a steam engine that runs 300 r. p. m. produces twice as much power as an engine that runs 150 r. p. m., all other conditions being the same. Consequently size is approximately inversely proportional to the speed.

7. *Easier to operate.*—Steam turbines contain very few trouble-producing parts, require practically no lubrication, and in general are very dependable.

8. *No oil in exhaust steam.*—There are no rubbing, reciprocating pistons, as in the steam engine. Thus the oil nuisance is eliminated. With reciprocating engines, oil often works its way into the boilers with the condensed steam and causes trouble. Oil in boilers has sometimes been the direct cause of boiler explosions.

9. *Close speed regulations.*—The rotor in the steam turbine also acts as a fly-wheel. It moves at a very high speed—much higher than the

* Copyright, 1921, by W. F. Schaphorst.

average cast iron fly-wheel, hence is not easily influenced. There are no retarding forces on the steam turbine blades similar to the retarding forces due to the starting and stopping of the reciprocating masses of the steam engine.

10. *Lower oil consumption.*—Lubricant is required for the two bearings, for the governor mechanism, and other moving parts, but the total quantity used is much less than is necessary with the reciprocating engine. Besides, this oil can be used over and over.

11. *No cylinder condensation.*—In the old reciprocating engine hot steam comes in contact with a comparatively cold cylinder wall, resulting in much steam condensation. This is avoided in the steam turbine because the steam flow is always in one direction, the temperature varying from one end of the turbine to the other end, directly with the pressure of the steam.

12. *Superheated steam can be advantageously used, for the same reasons as mentioned in paragraph 11.*—It has long been known that superheated steam has its advantages in reciprocating engines as well as in steam turbines. It sometimes presents mechanical difficulties in reciprocating engines, however, due to its high temperature and the resulting distortion which it causes in the heated parts. In the steam turbine, on the other hand, the blades may become slightly distorted, or they may become discolored because of the high temperature, but that will in no way detract from the efficiency of the turbine.

13. *Less danger from water.*—Many cylinder heads in reciprocating engines have been knocked out on account of the presence of water in steam. Water is a very dangerous thing in such engines. In the steam turbine, however, the same danger does not exist, although it is nevertheless well to be careful and keep water out. In case water gets into the turbine, the turbine usually slows down until the water passes out through the exhaust end.

14. *Lower first cost.*—In general, the first cost of a steam turbine is less than the first cost of a reciprocating steam engine of equal capacity. This may not always be true, but in four cases out of five it is safe to say that it is true. The surest way to find out, of course, is to compare prices from manufacturers of both steam turbines and reciprocating engines.

15. *Economical overload capacity.*—It is usually possible to overload either a steam engine or a steam turbine, but in both cases more steam will be required per horse-power developed. The turbine, however, is more economical when overloaded than the steam engine.

16. *A high vacuum is of more importance and results in greater economy when taking the exhaust of a steam turbine than when taking the exhaust of a steam engine.*

The steam turbine has made such tremendous progress of late that it is almost without a competitor in the field of large power production work. It has invaded all fields, even where water power is plentiful. The

municipal power plant is one of these important fields. The horse-power of steam turbine units now used varies from practically nothing (as used in connection with blowers) to 60,000 horse-power and more.

In the selection of a steam turbine for a power plant much depends upon the needs of the plant: first, whether present units are worn out and are to be supplanted by new ones, which is virtually the same as equipping a new plant, excepting that new boilers and other power plant devices may not be needed; and, second, whether the present units are in good condition and merely need additional equipment to handle the greater peak loads that occur from time to time.

Turbine Speeds

The larger the turbine and the higher the speed, the more economical is the combination.

There was a time when turbine speeds were too high to be practical. It was difficult to belt directly to the turbine shaft because the pulley was, of necessity, very small, and there was the ever-present danger of slip. The turbine could not be slowed down because it would then lose considerably in efficiency. Good reduction gears were wanted for many years, but gear makers were unsuccessful in turning out a product that was sufficiently quiet. To-day, however, we have good, accurately machined, comparatively quiet reduction gears, and as a result steam turbines may be operated at any speed that may be most economical. The reduction gears now produce shaft speeds from which belts and ropes may be easily run. In the typical modern municipal power plant, however, the turbine is directly connected to the generator, and no belts, ropes, or gears are used.

Steam turbines are made for operating on high pressure, low pressure, or medium pressure. Some are called "mixed-pressure" turbines because they are made to operate on a pressure of considerable range—high or low. Turbines are also operated condensing or non-condensing. Both of the latter are used in municipal plants, the condensing type usually being preferable because of its greater economy.

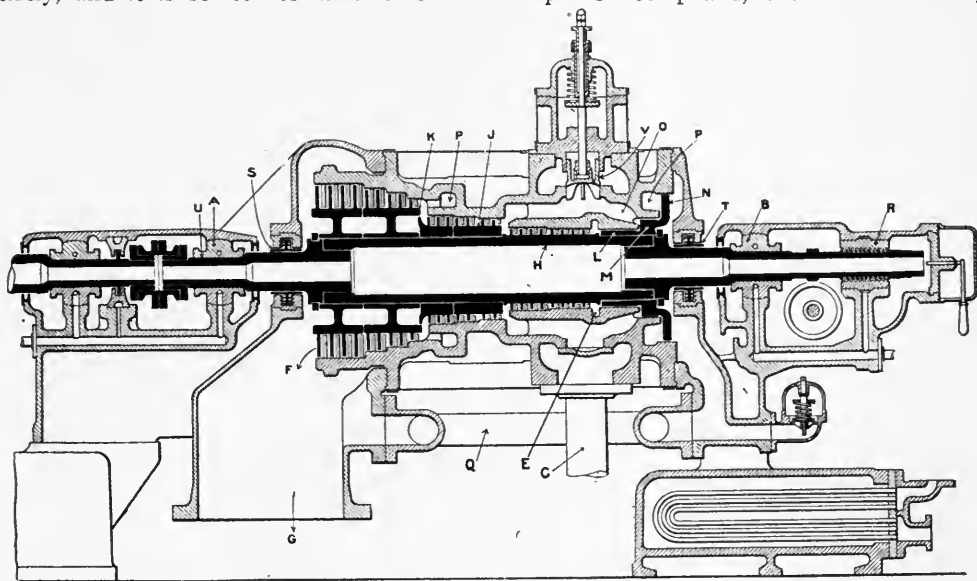
The Bleeder Type Turbine

In cities where low-pressure steam is to be sold for heating, drying, ice-making, or other industrial purposes, the bleeder type

of turbine is of considerable value. In the bleeder type this low-pressure steam is taken directly from the turbine, but not until it has first done a great share of the turbine's work in producing mechanical or electrical energy. Steam for heating and drying can be taken directly from high-pressure pipe lines through a reducing valve, true enough, but after passing through the valve it doesn't contain much more heat per pound than if taken from the turbine after it has done some mechanical good. Sometimes, again, engineers first run the steam through a non-condensing engine, and the exhaust is used for heating, drying, etc. This is better than to do away with the engine entirely, and it is sometimes difficult to im-

sive because it probably would require additional boiler capacity, perhaps involving expense for enlarging the building and materially increasing labor and up-keep cost. Seldom can more than 20 per cent of the new expenditure be netted from the sale of the old apparatus, considering installation costs, etc. Further, the additional power requirements, unless the increase is considerably larger, will seldom warrant a large expenditure.

"Well," you may say, "why not run the old reciprocating engine condensing?" It is well to consider that point. You might get a little more power out of the engine that way, true enough, but no engine, either simple or compound, even when running



SECTIONAL VIEW OF REACTION TYPE TURBINE

prove upon, especially where all of the exhaust steam can be utilized.

Reciprocating Engine and Turbine Combination

Sometimes where additional power is required, it is difficult to find anything better than an "exhaust steam turbine," that is, a turbine that will run on the exhaust from a non-condensing reciprocating engine.

Let us suppose that you have a non-condensing reciprocating engine in your plant and that the city has grown to such an extent that more power must be produced. This can be done by installing a larger or additional engine, but that would be expen-

sive because it probably would require additional boiler capacity, perhaps involving expense for enlarging the building and materially increasing labor and up-keep cost. Seldom can more than 20 to 25 per cent more power than when running non-condensing. The increase obtainable and practical will hardly be greater with a compound than with a simple engine, and in either case the change may subject the engine to a constant load greater than that for which it was designed. Where this is true, the overload is bound to prove injurious in time, and the economy improvement and power increase are partially counterbalanced by deterioration of the unit.

A more logical proceeding, and one which prominent power plants have commonly

practiced, is that of utilizing reciprocating engines during the first stages of expansion of the steam, and then leading the exhaust to low-pressure turbines, which capably handle the steam during the remaining stages of expansion. In this way it is sometimes possible to almost double the amount of power previously secured without increasing the duty on the engine and without using more steam than before. And the initial cost of the turbine and condenser may be less than would be the additional cost of boiler and engine capacity.

These low-pressure turbines exhaust into vacuums of from 24 to 30 inches. High vacuums are maintained by use of regular air-pump condenser equipment, steam jet-air pumps, turbo-air pumps, or jet condensers, much depending upon the quantity and cost of water available for condensing. For the smaller sizes the ordinary jet condenser, maintaining 24 to 26 inches of vacuum, may be used with satisfaction. Turbo-air pumps maintain higher vacuums—up to 29 inches and sometimes more. In large turbine units condensing apparatus maintaining a high vacuum will usually be justified. This is a point that cannot be easily decided offhand, but it is worth looking into carefully.

In general, the steam economy of a simple engine and exhaust steam turbine together is always an improvement over that which would be obtained by compounding the steam engine and adding a condenser. The plant capacity is frequently increased from 50 to almost 100 per cent by putting an exhaust turbine and condenser on a non-condensing engine. The turbine and condenser go into very small space, much less than the engine on which they generally operate. And as the combination takes the same quantity of steam as would the engine alone, and under the same conditions as before, without additional expenditure for boilers, chimneys, draft, coal-handling apparatus, buildings, and steam piping, it is plain that such a change might be more economical than any other change. The turbine and condenser, or turbine alone in a condensing plant, can be cut into the exhaust line from the engine without interfering in any way with the operation of the engine, and usually without otherwise altering the layout of the plant.

How to Make the Purchase

About the best way to buy power and

other machinery is to first write out all power plant and city conditions in detail that would affect or might be affected by the new machinery. The more the manufacturer knows about the plant, the more accurate will be his figures and recommendations. A sketch or sketches should be made, preferably to scale, showing the present arrangement and giving the principal dimensions, and what the new machinery is to accomplish should be explained.

When this is done, it will be unnecessary for the manufacturer to write letter after letter in order to get details. He will appreciate your efforts, will know that "sales arguments" will not help him much and that he is dealing with a city that knows what it wants and that wants figures, not arguments. Let several copies be made of the sketches and instructions and sent to the various manufacturers, so that each manufacturer may keep his set and all may then work simultaneously on the proposition for a new or additional installation. It should be insisted, of course, that the new machinery must do the maximum work, year in and year out, for each dollar invested. The manufacturer should be asked to use plain, understandable words in his recommendations and guarantees. Nothing should be accepted that is not fully understood, and no hesitation should be felt to inquire into the why and wherefore of every little detail. This will usually prevent future sorrow or distrust.

Neither should there be any backwardness about requiring guarantees under bond. That the manufacturer is reliable and well established should be determined at the outset. New honest firms will be glad to be investigated thoroughly.

In this way the purchaser does not specify the machinery himself. The manufacturer does the specifying or recommending. The problem is virtually "put up to him," which is logical, because all wide-awake manufacturers are well versed in power plant machinery and will do as much for their customers as possible. It is not uncommon for a firm to "turn down orders" and recommend competing apparatus. They would rather do this than have their own machinery fail to do better work than would their competitor's. Having received conditions in detail, each manufacturer can tell quite accurately whether or not his ma-

chinery will be best, and the purchaser will reap the benefit.

What to Tell the Manufacturer

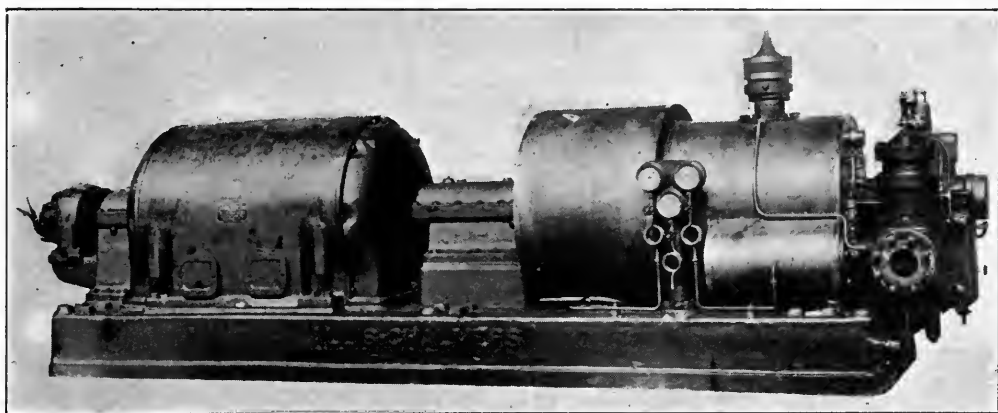
It is almost impossible to give the manufacturer too much information when he is asked to make a quotation. Give the normal horse-power developed by your plant at the present time. What kind of power are you now using, steam engine, or steam turbine, etc.? Are you operating condensing or non-condensing? Is the load constant? If not, state variations. If you have a typical load curve, it will be helpful to the manufacturers. If you are operating condensing, state the vacuum in inches. How much, if any, additional horse-power do you wish to develop? Or do you simply want more economical operation? If the turbine is wanted for driving a generator or alter-

excuse for trial installations, excepting on rare occasions.

Small Steam Turbines

There are a number of small steam turbines on the market suitable for connecting to centrifugal pumps, fans, blowers, etc. These may often be installed to advantage in the municipal power plant. They are made to operate with steam pressures varying from 50 to 300 pounds per square inch with or without superheat, and either condensing or non-condensing. They will develop as little as 10 horse-power and as much as 400 horse-power and operate at speeds of from 1,000 to 5,000 r. p. m.

The first illustration shows a longitudinal sectional view of an Allis-Chalmers "reaction type" turbine. "A" and "B" are the bearings—the only rubbing parts of the en-



STANDARD NON-CONDENSING STEAM TURBINE DIRECT-CONNECTED TO GENERATOR

nator, state size and voltage and whether the electrical unit must be paralleled with others. Also, whether current is direct or alternating. If alternating, give the number of phases, cycles, voltage, etc. Do you expect to utilize any of the present power plant equipment? Tell the manufacturer what your own opinion is, if you have one, regarding alterations that should be made.

Some manufacturers make steam turbines only, but are willing to furnish the unit complete—with generator, exciter, switchboard, etc. Be sure to state whether or not a complete unit is desired.

Whether or not a steam turbine or turbines will be the most economical and best installation in your city can be determined with certainty beforehand. With the present knowledge of the turbine there is little

tire turbine. Steam enters at "C," then through the passage "E" and, turning to the left, as seen in the cut, passes through alternate stationary and revolving rows of blades, finally emerging from them at "F" and flowing through the connection "G" to the condenser or to the atmosphere, depending upon whether the turbine is designed for condensing or non-condensing operation.

The second illustration depicts a non-condensing steam turbine directly connected to a generator. This design is made in sizes from 250 to 750 kw. Although these turbines are not as economical as condensing turbines, or as economical as many non-condensing steam engines, they are often used because of the many advantages of the steam turbine which are enumerated in this article.

The County Unit as a Teacher of Health

By B. F. Austin, M. D.

Health Officer, Morgan County, Alabama

EVEN though the state of Alabama has public health laws to provide for properly handled food supplies, clean water, safe milk and the extermination of disease-carrying flies, mosquitoes, rats, etc., it is the consensus of opinion that it is only by instruction and education that it will be possible to instill habits of personal hygiene and conserve the personal health of the public. The purpose of this article is to discuss the methods of educational work used by the Health Department of Morgan County, Alabama.

Lectures, Newspaper Articles, Literature

Lectures are delivered at public meetings, special gatherings and schools. The public meetings are, as a rule, presided over by a member of the community in which they are held. Only one subject is covered at each lecture, and the Health Officer en-

deavors to talk not longer than thirty minutes. The lecture is followed by a series of lantern slides.

Newspaper articles giving instruction along the lines of sanitation and prevention of disease, are written every week by the Health Officer.

Literature is distributed by the members of the Health Department, especially to those who have a contagious or preventable disease in their household. Posters dealing with health subjects and preventive measures have been placed on country stores and at prominent crossroads.

Sign-Posts

The idea of the sign-posts with health sentences was obtained from a similar project advanced in Lee County, Mississippi. A design for the posts was made, with a top-board, giving the distance to the nearest town and featuring a health sentence. On the lower part of the sign-post was space for three advertisements. This design was presented to the local sign-painter for a bid. The plan was then placed before the business men, with the price for advertisements such as to just cover the cost of the sign. Enough advertisements were obtained to place the sign-posts at one-mile intervals for six miles on all roads leading to the principal towns and at all bad curves on these roads. To create public interest in these signs, a contest was held to secure the best possible health sentences for the posts. Prizes donated by business men were awarded to the authors of the best six slogans. Sentences were received from men, women and children in all sections of the county.

Exhibit at County Fair

In arranging a health exhibit for the county fair, the main idea was to present something that would be not only attractive, but educational as well. Hence, the visitor was shown a fly's foot under the microscope, and the fact that so much filth and dangerous disease-germs are carried on the hairy feet and legs of flies, was emphasized. Under a second microscope was



ONE OF THE HEALTH SIGN POSTS ERECTED IN MORGAN COUNTY, ALA.

shown a malarial parasite, and here emphasis was laid on the mosquito as the carrier of malaria. Instructions were also given as to methods for the prevention of this disease. Under a third microscope were shown tubercle bacilli, and here were stressed the dangers, ways of transmission, and modes of pre-

vention of tuberculosis. Dolls were placed in small beds on a table to represent cases of illness due to preventable diseases occurring in Morgan County last year. The cost of these cases and deaths due to preventable diseases was shown by the use of placards.

Next, there was a series of character brushes representing a quarrel as a result of which the tooth-brush was declared most valuable of all brushes and crowned king. Placards with the following quotations were placed with each brush:

Broom.—"I have to keep the house clean of dirt from attic to cellar the year round, and my work is most important of all. I think I deserve the crown."

Scrub-brush.—"Mr. Broom exaggerates when he says he *cleans* dirt, for I am constantly being put to cleaning after his brushing. Hence, I am sure that I deserve to be King of Brushes."

Clothes-brush.—"It is true that Mr. Broom moves more dirt in a year and Mr. Scrub-brush cleans more than all the rest of us, but I claim that it is quality of work, not quantity that ought to count. Mr. Broom does the heavy work of cleaning floors, stairways, etc., but when they want a really good job done, when they want the clothes they wear to be spick and span, they call on me."

Hair-brush.—"Brother Clothes-brush is right, but his argument counts much more for me than it does for himself. The clothes are more important than the floors, etc., but the head is more important than the clothes, and I have by far the greatest work of all to do."

Tooth-brush.—"If other brushes are neglected, our masters will look untidy, but will not get ill; while if I were not used, there would be tooth-ache and misery and illness as a result. I ought to be King of all Brushes."

Arms and legs were attached and faces



PARTS OF A COMPLETE SEPTIC TANK READY FOR ASSEMBLY

were painted on all the brushes. A crown made of tinfoil was placed on the top of the tooth-brush.

Two bottles of milk, one placarded as having been highly infected with typhoid bacilli and condemned by the Health Department, the other pure, were shown, to demonstrate that there is no apparent difference caused by this dangerous contamination. Two glasses of water were used in the same manner. Upon the wall were placed posters with witty health sentences, cartoons and pictures bearing on health. A small portion of polluted soil and some contaminated vegetables were shown to demonstrate two sources of human infection by hookworm disease.

Owing to the difficulty in getting drinking water at the fair grounds, the Health Department secured a 45-gallon barrel and with the use of two 10-gallon milk cans was enabled to keep plenty of good, cool drinking water for the crowds visiting the booths. Individual drinking cups were supplied by a firm as a manner of advertising.

School Work

It is the opinion of the Morgan County Health Officer that every child should receive as careful attention physically as mentally. Therefore, it is our purpose to make a physical inspection of every school child in Morgan County during this scholastic year. Physical inspection of schools is the means by which many defects that should receive early attention are recognized. Parents are notified of the existence of these defects and urged to get them corrected.

Proper Sizes of Pipe for Water-Works Distribution Systems

By Waldo S. Coulter

Consulting Engineer, New York City

THE older water-works systems of small towns—and of many large ones too, for that matter—usually contain a considerable amount of 4-inch piping, with long lengths of 6-inch to outlying sections; four-inch hydrant branches are not uncommon. In earlier days these sizes were used because it was the general custom. Later, extensions were installed along the same lines, either because officials and superintendents were accustomed to the practice, or because economy seemed to dictate it.

For normal domestic consumption these sizes proved adequate. It was only when a fire occurred that deficiencies in flow and pressure became evident.

As domestic and industrial consumption increased with the growth of the community, a time would eventually arrive when these approached the rate that had previously represented fire flows. In some cases this increase has been accompanied by a growing deficiency of storage in stand-pipes, tower tanks or reservoirs.

Difficulties in an Outgrown System

But even where the supply and storage were ample, increased rates of flow for normal conditions, brought about by a regular and rapid growth of population and industries, have caused serious friction losses in the 4- and 6-inch pipes, which before had caused no difficulty except in case of fires. In other words, legitimate increases in the rate of flow required to satisfy normal consumption, had reduced the residual pressures, or pressure head, to a point where water would flow sluggishly from taps and, perhaps, practically higher portions of the town, during the hours of maximum consumption.

This condition may easily occur where the distribution system contains much small piping, especially if it is not thoroughly cross-connected, even though there be no lack of initial supply and even though a reasonable initial pressure is maintained at the inlet to the system. The entire diffi-

culty may be, and not infrequently is, caused by piping of inadequate size.

Where the distribution system has been outgrown in this manner, however, other features are also usually outstripped. The supply works—reservoir, stand-pipe, tower tank or trunk lines feeding the system—that once furnished a sufficient supply to the distribution piping, may require enlargement or replacement. Because the designer of the plant hewed too closely to the line and failed to make adequate provision for future increases of population or industries, the writer has seen supply works and tower tanks reach this stage within eight years after construction.

One will sometimes find a plant where the increased consumption producing this condition is due, not to a legitimate growth of population or the incoming of new industries, but solely to preventable wastage by consumers, or leaks through blown-out joints, split pipe or breakages at the connections of hydrants to their branches.

The aggregate of the losses which may occur by leakage with no indications at the ground surface is surprisingly large. If services are unmetered, this leakage may continue unsuspected for years, even though the pumpage or reservoir discharge be measured, since, without service meters there is nothing to show that excessive consumption may not be due to the reckless waste that commonly attends the unregulated use of water.

The usefulness of a distribution system may be often restored and the enlargement of reservoirs, tanks or supply works rendered unnecessary by the metering of services alone.

To Insure Adequate Fire Protection

Before the losses in a distribution system have advanced to the point where domestic service is affected, inadequate fire protection will usually force action of some kind, particularly if hydrant pressures alone are relied upon to fight fires. Sometimes it requires a disastrous fire to bring this about.

Sometimes an examination by the engineers from the rating office of an insurance body, followed by an adverse report and increased insurance rates, will induce activity before a conflagration occurs.

Where the pipe sizes are so small and the distribution system so unsatisfactory that practically a replacement of it appears necessary to secure proper fire protection, matters may sometimes be greatly improved by lessening the normal consumption by metering all services and afterward undertaking a leakage survey. This will leave a larger margin for fire flows and, with an enlargement of piping at certain points and the installation of cross-connections at critical places and the elimination of dead ends, may be sufficient to place the system in shape to render fair fire service. Sometimes the use of pumps, in addition to the foregoing, will insure reasonably good service.

Again, the system may not be beyond restoration by partial replacements and connections, alone, at a cost within reason. If this is possible, and direct hydrant service can be so secured, it is always preferable to pumps.

Or, the system may be placed in shape simply by providing higher initial pressures at its inlet, in cases where the existing initial pressure is low. This may require a new reservoir location, a higher tower, tank or, perhaps, a booster pump.

Each such case will present an individual problem, and no general method of improvement, universally applicable, can be indicated. One could fill page after page with

conditions that might be and are encountered, each with its several possible methods of treatment, but it would convey little meaning, since only an examination by an engineer specializing in such work can determine what the conditions and possibilities actually are in any given instance.

One piece of advice can, however, be confidently given. Do not use 4-inch pipes anywhere in your distribution system. Do not install long lengths of 6-inch pipe without the advice of a competent engineer.

Where the fall of the ground is sufficient, a 6-inch pipe line may be extended for a considerable distance into an outlying district, but the probable future increase of consumption must not be so great as to invalidate the usefulness of the pipe during its lifetime. Assuming a combined domestic and fire flow of 600 gallons per minute, a fall of about $46\frac{1}{2}$ feet in a thousand will counteract all friction losses, making allowance for future fouling of the pipe surfaces.

A slope of 20 feet in a thousand will give a net loss of head equal to about $26\frac{1}{2}$ feet per thousand, equivalent to $11\frac{1}{2}$ pounds, for the maximum flow. With an initial pressure of 75 pounds, and a required residual pressure of 50 pounds at an outlying hydrant, the pipe could be about 2,170 feet long. As the domestic flow forms but a relatively small part of the total, any diminution of it along the pipe is not considered. It will be noted that for this last example, the static head at the end of the line will be about $216\frac{1}{2}$ feet, equal to about 94 pounds.

Gravel Survey Saved Iowa More Than \$100,000

Iowa gravel hunters working under the direction of the State Highway Commission undoubtedly saved the state of Iowa on the construction work of 1920—to say nothing of additional savings in this and later years—more than \$100,000. Technically speaking, the gravel hunters were conducting a survey of the road-building resources of the state. In this survey undeveloped gravel deposits were examined in 24 counties and searches made for entirely new deposits. Through the efforts of the department new gravel deposits were found and opened up which were used as the sole supply for a number of paving jobs.

The saving in cost to the county in supplying gravel from these deposits instead of contracting at prevailing prices from commercial plants in operation, totalled far above \$100,000. In several instances, moreover, had the deposits not been located, it would have been impossible to proceed with the contract because of inability to secure the needed coarser aggregate. Technical inspection and tests were made from time to time of the quality of the material being produced at eighteen of the larger commercial gravel supply plants whose product was being used on primary road construction projects.

A Spectacular Fountain for Dallas, Texas

Low Costs Bring it Within the Means of the Average City

A STREAM of water, spurting 75 feet in the air, beautifully illuminated by ever-changing colored rays from four powerful incandescent search-lights hidden beneath plate glass at the base, will be the



ILLUMINATED BY COLORED RAYS AT NIGHT, THIS FOUNTAIN WILL BE ONE OF THE FEATURES OF THE CITY

outstanding feature of what promises to be America's most spectacular fountain now being erected in the sunken garden of Ferris Plaza, facing the new Union Station at Dallas, Tex.

It will be known as the Pan-chromatic illuminated fountain. The idea was originated by W. D'A. Ryan, the director of the illuminating laboratory of the General Electric Company at Schenectady, N. Y. Colored flood-lights have been used before in illuminating fountains, but never before has the scheme of using 5,000,000-candle-power incandescent searchlights with constantly changing colored screens been attempted. The chief advantage is that the search-lights will cast a beam of colored light to the very top of the stream, a distance of 75 feet, while variegated colors illuminate the falling waters.

The large basin is 50 feet across, and the secondary or elevated inner basin is 14½ feet in diameter. In the outer water of the large basin are eight small jets, each illuminated by a colored flood light from beneath. In the small basin, spurting water toward the main stream, are eight dolphins. Underneath the inner basin, which has the plate glass ceiling, is a circular chamber, 14 by 8 feet. This houses the four big searchlights and apparatus for operating the changeable color screens. Entrance to this is from a small passageway leading to a manhole on the outside of the larger basin. The entire system is automatic and needs no attendant, except in case of some emergency.

It is expected that the fountain will be completed this summer, and plans call for its illumination every night during the warm months. The fountain itself is not elaborate and is therefore within the financial means of any small city. Because of this spectacular effect, and the vivid impression it is sure to make on visitors to the city, it is believed the idea will be widely duplicated, once the fountain in Dallas is given a practical test.

What Do Strangers Think of Your City?

Civic pride is concerned in street and park lighting, for a city is often judged by its first impression on strangers, and there is the gain in safety to pedestrians, traffic and property which proper illumination invariably engenders.

The State Police of Pennsylvania— A Model of Efficiency

Type of Organization and Equipment Worthy of Study by Municipal Officials

WITH agitations in many states and cities and in many sections of the country for a largely augmented policing system and more rigid enforcement of federal, state and city laws in general, the Pennsylvania State Police organization is quite generally being referred to as a model police force. When the record of growth and achievement, the perfect coördination of effort and plans, and the high and immutable code of honor of the organization, are considered, the reasons for the enviable position the organization has attained are apparent.

The activities of the organization are directed from the executive offices in the Capitol Building at Harrisburg, with Major L. G. Adams as superintendent, and Major W. E. Mair, deputy superintendent. Fully 80 per cent of the entire organization is composed of former U. S. Army men. The plan of operation and coördination is worked out to the minutest detail in every branch of the State Troopers' organization. Five main troops, A, B, C, D and E, are maintained, with headquarters and barracks at the following points in the state: Harrisburg (Main Office) Troop A, Greensburg; Troop B, Wyoming; Troop C, Pottsville; Troop D, Butler; Troop E, Lancaster. Each troop maintains 14 substations, with 3 to 5 men and equipment, so that the state is well covered.

Each main troop is comprised of 1 captain and 1 lieutenant, officers in charge, and 80 enlisted men, and is equipped with 14 motor-cycles, 2 automobiles, and approximately 50 horses for transportation.

The duties of the organization are perhaps wider in scope than those of any other police organization. Besides the enforcement of criminal laws, the state forestry, automobile, and fish and game laws come directly under its jurisdiction. It does not directly concern itself with federal and local laws, though the constitution states that it shall render assistance to government or city officials whenever called upon.

The Great Aid of Motor-Cycles

A fleet of 70 motor-cycles was purchased and put into service early in 1920 by the state. Referring to the use of motor-cycles by the troopers, in the January number of a bulletin issued by the Department, Superintendent Major L. G. Adams said: "The use of motor-cycles had the effect of giving an officer an increased area which could be covered, reduced the time of answering calls for assistance, and expedited the numerous investigations the state police were called upon to make." Superintendent Adams also pointed out that violations of automobile and highway laws, with respect to overloading of trucks, headlight lenses, etc., were also greatly reduced as a result of the employment of motor-cycles by the Department.

The statistics concerning the use of these motor-cycles are of unusual interest, especially since accurate record of the maintenance cost of each machine was kept, and the figures given are authenticated. Covering an average period of 5½ months' service, the total expense for gasoline was \$2,322.51, and the total mileage of the entire force of machines was 459,477 miles. This, computed, shows that the cost for fuel was in the neighborhood of ½-cent per mile. Figured on a basis of the number of gallons used, the mileage per gallon obtained is 59 miles and a fraction. The expense for tires was \$159.31, and \$1,701.50 was expended for general repair and replacement.

The motor-cycle troopers have many exciting and hazardous experiences, especially since the Twentieth Century crook and law-breaker is so generally equipping himself with a speedy and powerful means of conveyance. The instances in which the mounted men have recovered and returned stolen automobiles to their owners, are virtually without number. During 1920, stolen automobiles to the value of \$295,309 were recovered.

Only a few months ago, Troop A Headquarters received word that the messenger for the Citizens' Deposit and Trust Com-

pany in a western Pennsylvania city had been held up and robbed of \$82,000. Four young men in a big blue-touring car, headed east, were alleged to be the guilty parties. At once six motor-cycle men were dispatched to the scene from troop headquarters, and began combing the entire territory. The same day word was received from Laughlintown, that four men riding in a big blue car had stopped at the village garage for supplies. After having a new tire fitted and the gas tank filled, they made payment by viciously assaulting the garage-man with an engine starting crank, leaving him unconscious. The Bedford substation, in which direction the car was headed, was notified, and two motor policemen from that station traveled 34 miles and intercepted the car with its load of crooks after they had covered 20 miles. This gang, while not guilty of the robbery of the messenger, admitted robbing a garage at Beaver Falls. Upon investigation it was also found that two of the men were wanted in Detroit for highway robbery and murder.

A detail of two motor-cycle men is kept on night patrol duty on the principal highways of the state during the greater part of the year. While serving on night patrol,

two state officers observed a wildly careening car advancing toward them at a high rate of speed. The two officers gave chase and every time one of them approached to command the driver to stop, he attempted to run the officer down. The car was brought to an abrupt stop, and the net results of this exploit were, one stolen car, a load of liquor and four persons implicated.

The state police is also of direct and material benefit to the farmer and the rural resident. In 1920 alone, livestock and miscellaneous property to the money value of \$543,697 was recovered. The first day Troop B put its motor-cycles into operation, two high-priced stolen automobiles were recovered.

Over 225 classifications of crime appear on the records of the State Police of Pennsylvania, and for the year 1920 a total of 87,756 arrests were made, of which 67 were for murder. Referring to the number of arrests made, Captain Price, an old and valuable member of the executive staff, asserted that the efficiency of a troop is not measured altogether by the number of arrests made; rather, the object is suppression of crime and consequent reduction of arrests.



A SQUAD OF PENNSYLVANIA STATE POLICE PREPARING FOR A DAY'S WORK ON THEIR MOTOR-CYCLES

Forward Steps in Municipal Affairs

Public Welfare Departments

How Detroit Is Meeting the Unemployment Problem

DETROIT, MICH.—The effect of temporary unemployment in bringing individuals and families to the point of distress, was making itself felt in Detroit in a limited way during September and October. The attention of the Mayor was called to this condition in its earliest stages, and various attempts were made by the Mayor and the Common Council to meet the problems constructively.

As a first step, the Mayor drafted an appeal to the employers, asking them to ration their available jobs and to reduce their working hours so that the maximum amount of labor might be provided for. Following that, a meeting of the heads of the city departments was called to consider ways and means for increasing the available amount of public work and its proper distribution to the men with dependent families who stood in most urgent need of jobs. An increase in city work was planned, and an employment clearance-house was organized on October 20, 1920, under the Department of Public Welfare, to register the unemployed and to select for the available city work the men who were most in need of it. Up to February 4, 1921, 16,402 men had applied for city work.

With the further shutting down of industrial plants and reductions in the working forces, the problems of distress became more acute, and the Department of Public Welfare was finding some difficulty in meeting it by furnishing city work, or through its normal relief equipment. Permission, therefore, was granted by the Common Council

to the Department of Public Welfare to enlarge its organization, and at the end of January the work of the Department, previously concentrated in one main office, was distributed to five offices, and an appropriation of an additional \$250,000 was granted to take care of the increased demands for public relief.

It has been the policy of the city of Detroit to avoid the establishment of soup kitchens and bread lines and to distribute relief to the unemployed upon as dignified a basis as possible. For the month of January, 1921, approximately 5,500 families were given a total of \$125,000 relief. This money is distributed in orders which can be cashed at any of the grocery stores; fuel is sent to the individuals and families who require it; shoes and clothing are furnished, and rent paid wherever necessary. The applicant is encouraged to consider this relief as a temporary loan without interest, given by the city, which he may repay later if he so desire.

HARRY L. LURIE,
Director, Social Service Department.

Public Safety Departments

Ghastly but Effective Reminder

LOUISVILLE, KY.—This city has recently conducted a very successful safety campaign. The Mayor, George W. Smith, appointed a Citizens Safety Committee, which raised \$1,000 to conduct a Safety Week. This committee, in turn, appointed 29 subcommittees, which were composed of persons interested in different kinds of street traffic, of persons or firms through whom advertising might be sent to the public, of institutions where instruction on safety might be given. Every available agency in the city through which the people might be



A SIGN THAT MAKES PEOPLE THINK

reached with printed or spoken propaganda was enlisted in this campaign.

A part of the public advertising consisted of slogans placed in every store, of stickers which were put on the shield of every automobile, of banners suspended from the trolley guy wires. A very effective part of the advertising was the erection of a gravestone, similar to the one shown in the picture above, wherever a fatal accident had occurred during the past year. While the effect was rather ghastly, these gruesome

reminders drove home the truth and caused more comment than any of the other advertising matter employed by the committee.

GEORGE T. RAGSDALE,
Director, Policemen's Training School.

Park Departments

A Satisfactory Power Sprayer

SPOKANE, WASH.—Being in need of new spraying equipment, the Superintendent of Parks in Spokane found that few improvements had been made in this sort of equipment in recent years and decided to contrive two power sprayers.

The Department already had on hand several 600-gallon tanks which had been used in road sprinkling. Two GMC 2-ton motor trucks were bought, fitted with such power take-offs as are used in driving the power hoist in regular dump-bodies. The tanks were mounted on the truck frames, with pumps in front of them behind the driver's seat. The power take-off shaft was lengthened, running back to a holder on the cross-frame of the truck and fitted with a sprocket of the proper size and a Whitney chain running to another sprocket on the pump driving shaft.

Of the two pumps employed, one was a No. 432 triplex Douglas, which the Department already had on hand; the other was a Bean Double Giant Triplex spray pump bought for the purpose. Both pumps have given satisfactory service. It is impossible to give the exact cost of this equipment. Without the tanks, each unit cost approximately \$3,000; the work of assembling was done by the mechanics in the city garage, and much of the equipment represented material already on hand.

It is believed that this equipment, in spite of the considerable initial expenditure, is actually economical. The operating costs per day are itemized as follows: gasoline and oil, \$4 to \$5; labor, \$20 (truck driver, \$5.20, two hosemen, \$4.60 each, foreman, \$5.20); total 25, exclusive of overhead. It saves the \$8 or \$10 per day paid by the city for hired teams.

As Spokane is not infested with leaf-eating insects, most of the spraying is done in the winter months. Only soluble oils have been used for winter spraying, and



MOTOR-PRESSURE SPRAYER USED BY PARK DEPARTMENT OF SPOKANE, WASH.

the tanks have therefore not been equipped with special agitators. Once in a while the relief pipe from the pump of an extra hose is put in, and this has proved sufficient to keep the mixture agitated. For such sprays as lime-sulphur, kerosene emulsion, or arsenate of lead, an agitator would be necessary and could readily be devised.

The delivery pipes should be arranged to run to the back, right-hand side of the truck. If this is done, it will never be necessary to lay the hose across the street.

One great advantage of this equipment is that the main part—the truck—is never idle. When the spraying work has been finished, the tanks and pumps are dismounted, and ordinary dump-bodies are fitted to the frames. They can then be put to work in road and street construction.

JOHN W. DUNCAN,
Superintendent of Parks.

Highway Departments

Retarding Pavement Openings

GARFIELD, N. J.—One of the trials in the life of the city engineer who is building a large number of new pavements throughout the city is to see them torn up shortly after they have been laid, for the purpose of installing water-mains, electric conduits, sewers, or other subsurface structures,

Some cities, notably Toledo, Ohio, are fortunate in having ordinances prohibiting the opening of a pavement except in case of emergency for periods of two, three or five years after the new pavement is laid. The writer has not been fortunate in securing the passage of an ordinance of this type, but has made it a point whenever any group of property owners submit a petition for the improvement of the paving on any street, even before any specific action is taken regarding the petition, to send a notice of a more or less personal character to the Public Service Corporation, the Water Department and the Department of Public Works, stating that the improvement of a certain street is contemplated and that it would be a good idea to look into the matter of laying mains, conduits, sewers, or whatever subsurface structures are needed, prior to the laying of the permanent pavement. In this manner these departments are given ample opportunity to put in the needed sewers and run the connections as far as the curb, and to make whatever repairs are known to be necessary and may have to be attended to within a year or two after the new pavement is laid.

This is a most excellent idea and one which can be readily copied by other small cities not blessed with an ordinance similar to that in Toledo, where the streets are posted prior to new construction and the surface cannot be torn up for five years after the permanent pavements are laid.

Health Departments

For Clean and Sanitary Food Distribution

FORT WORTH, TEX.—This city has recently passed an ordinance to prevent persons with communicable diseases from being employed in any "food establishment."

A food establishment is construed to mean restaurants, hotel dining-rooms, cafés, cafeterias, lunch counters, ice cream parlors, soda fountains, soft drink stands, grocery stores, fruit stands and all other places where food is sold, prepared for sale, distributed, or displayed for sale.

No person affected with tuberculosis or any other communicable disease may be employed in any food establishment in any way; nor may any person be employed in such establishment during the time when a communicable disease exists where he or she resides, unless by a permit. Anyone suspected of having a communicable disease, who fails to appear for examination, may be taken by the City Health Inspector to the City Physician for examination. No person shall be permitted to work in a food establishment whose certificate does not show that it was issued within the preceding ninety days.

Any person or firm neglecting, failing, or refusing to comply with the provisions of the ordinance shall be deemed guilty of a misdemeanor, and when convicted shall be fined not less than \$10 nor more than \$100. Each day of failure to comply is regarded as a distinct offense.

The ordinance has been rigidly enforced and with very satisfactory results.

I. A. WITHERS, M.D.,
City Health Officer.

Recreation Departments

The Diverse Uses of a City Auditorium

DENVER, COLO.—The city auditorium of Denver is a wonderful building, in truth. It has accommodated crowds seeking entertainment through the medium of the drama, grand opera, light opera and concert; it has

been the scene of religious meetings, revival meetings; it has housed 700 United States soldiers during strike duty for two months; it has sheltered homeless people, driven to it for shelter during the Cherry Creek flood in 1912; it has accommodated a horse show, a three-ring circus, an athletic track meet, industrial expositions of many varieties, political conventions, Christmas and patriotic pageants, boxing and wrestling matches; in fact, there is hardly any form of public entertainment or ceremony that has not been staged in this building. One of the most impressive ceremonies ever witnessed there was the funeral service in honor of the late Mayor, Robert W. Speer, in whose term of office the structure was built.

The city gives the use of the auditorium free of charge where no admittance is charged to the public, and when the public will derive a general benefit from its use. Following is a partial list of the gatherings held there during recent months:

Discussion of means of lowering the cost of living, General Pershing meeting, American Legion meetings, all free to the public; two musical concert series during the winter months, free organ recitals by the Municipal Organist, Palmer Christian, including community singing conducted by the Municipal Chorister, Professor J. C. Wilcox, and led by the Municipal Chorus of three hundred voices. These concerts are given every Sunday afternoon during the winter and include a season of afternoon concerts. The attendance averages 8,000. During the summer months, Organist Christian gives organ recitals daily except Sunday, and these also are free to the public. The average attendance at these concerts is twelve to fifteen hundred. Other entertainments include: Potato show, Christian Science meeting; Friends of Irish Freedom, Women's Club meeting, Queen of Heaven Orphanage concert, Knights of Columbus meeting, free War Camp Community dance, Police Department meeting, welfare community pageant on Colorado Day, meeting of the mayors of Colorado towns to launch the Tri-Tunnel bond amendment to the state constitution, sorority and fraternity entertainments, community singing, Democratic and Republican political conventions, War Camp Community Service, St. Patrick's Day dance and pageant, Board of Education mass meeting, dance of the Amer-

ican and French Children's League, Masonic meetings, concert by the Cathedral Choir, labor union conventions, railroad employes' dance, Real Estate Exchange convention, musical comedy and grand opera, dramatic plays, joint High School commencement, Press Club show, Veteran Volunteer Firemen's Association convention, United States Marine concert, International Bible Students' convention, Old Ladies' Home entertainment, Municipal Industrial Exposition, Boy Scout Band concert, Rocky Mountain Screen Club dance and show, Spanish War Veterans' convention, Baptist and Methodist Church concerts, coal men's convention, teachers' convention, Colorado Educational Association convention, American mining Congress, Americanization Organization, World Series baseball.

The Industrial Exposition conducted by the Industrial Development Bureau of the city and county of Denver lasted from June 1 to 26, and drew an attendance of 62,883 for the week. A petition signed by each of the 150 exhibitors asked that it be made an annual event.

For several years past free baseball returns on electrical score-boards have been given by the city in conjunction with a local newspaper, which furnishes the telegraphic service, and this has proved the most popular of all auditorium entertainments. Almost as many women attend as men. The entire auditorium is thrown open for this event, two score-boards, back to back, being in use. The average daily attendance during the World Series is from six to nine thousand people.

Election returns in the auditorium are given by the city, some local newspaper furnishing the telegraphic service, during all important elections. Instead of standing upon the street in front of a newspaper office, people are permitted to enjoy themselves in comfortable seats and are entertained during the returns by selections on the municipal organ and by singing led by the Municipal Chorister. Both the City Chorister and the City Organist are permanent city employes, on salaries, and ready at all times to give their services to the public. During the last presidential returns it is



BY DAY OR NIGHT THE AUDITORIUM IS AN ORNAMENT TO DENVER

estimated that 20,000 persons were at the auditorium, there being a constant flow of people in and out of the building. So well accustomed have Denver people become to this free use of the auditorium that it is exceptional for the auditorium attendants to caution any person about unruly conduct.

During one of the last World Series baseball games, the house manager changed the house from full capacity to theater capacity, with the crowd present. Two thousand persons who had just sat for two hours through a baseball game remained in their seats for two hours and thirty-five minutes longer while the great proscenium arch was raised through the ceiling and the theater side walls, holding upper and lower boxes filled with people, swung out into the theater. Many had brought their lunches and ate them during the transformation.

The auditorium is fully equipped with a removable dance floor and stage settings of every description. It is also equipped with a moving picture gallery and an enormous picture screen, neither of which is visible when not in use. The theater seats 3,300. The stage is a hippodrome affair, large enough to accommodate a three-ring circus, and has been used for the largest theatrical spectacles presented in the country during recent years. For two years the auditorium was leased to Shuberts, under arrangement whereby people were admitted at popular prices.

J. J. VICK ROY,
Commissioner of Supplies.

Recreational Activities in Evening Classes in Pittsburgh Schoolhouses

PITTSBURGH, PA.—The Bureau of Recreation has formed aggressive plans which are rapidly making that city a leader in recreational activities. The city has authorized the issue of \$831,000 in bonds for the purchase, improvement and equipment of playgrounds. Among the features will be four additional open air swimming pools, to be located in various sections of the city at a cost of about \$100,000.

Women and girls in large industrial plants and stores have been organized into classes for gymnasium work, dancing, nursing, sewing and other activities. Six schoolhouses were used, each one night a week, the groups being so divided as to avoid confusion. These classes were very popular. Two Lithuanian groups were also organized, as well as a group of Polish mothers, a girls' club, and four troops of Girl Scouts. The average attendance for each group has been close to fifty; the response has been enthusiastic and apparently lasting. An experienced teacher instructed a group of colored girls in the ways of playground work, so that they could go into their own churches and social organizations and continue the work among their own people.

CHARLES F. BALL,

Superintendent, Bureau of Recreation, Department of Public Works.

Can Your Community Qualify for This Child Health Demonstration?

Preliminary plans for a child health demonstration have been announced by the National Child Health Council, with headquarters in Washington, D. C. With an appropriation of \$200,000 set aside for this purpose, the Council, composed of six leading national health bodies, will assist some American community of between 20,000 and 30,000 population and the surrounding county in securing as nearly as possible ideal conditions for the development of its children into sturdy, happy, useful citizens.

The first step will be the selection, by a committee of experts, of the community in which the demonstration will be carried on over a period of five years. The following are the requirements:

The town or city should be located in a county of between 50,000 and 60,000 population.

The population should be fairly stable. The age distribution of the population should be fairly near the average, especially as to the percentage of children and babies. There should not be any strikingly predominant racial stocks. The city or town should have a normal percentage of its population engaged in manufacturing. There should be a variety of industries in the city. The surrounding area should be an agricultural territory. The town should be in a birth registration state and should have fairly complete vital statistics. The mortality of infants and children should not be strikingly abnormal. Health conditions should not be abnormally good or bad, and health machinery, including state laws, local ordinances and personnel should be equal to those of a community of similar size.

The Insect Problems of American Cities

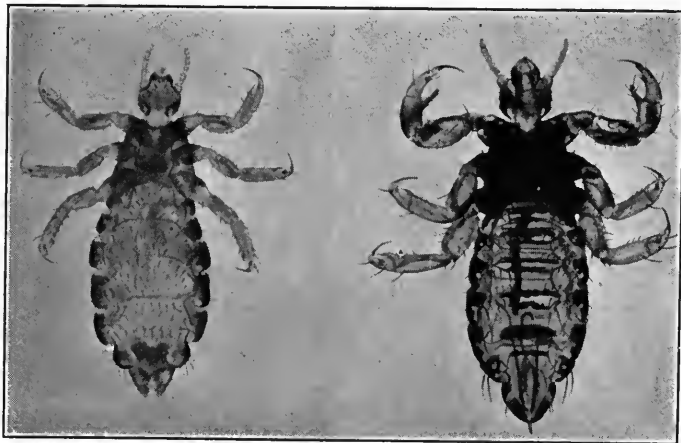
I.—Vermin, the Carriers of Dread Typhus

By W. Dwight Pierce, Ph. D.

IN the Middle Ages, when plague and typhus swept through cities and armies and carried off people by the thousands, it was construed as an act of Divine Providence, against which human efforts could be of no avail. In our more enlightened day we see the natural laws of the Divine Providence in action, and also see that when these plagues visit their wrath upon mankind, it is because natural laws have been violated, and by righting the wrongs we can have immunity. When typhus fever breaks loose in a city or congested population it is because the law of personal cleanliness is being most scandalously neglected by some portion of the population.

America Threatened by Typhus

We are reading every few days now of the efforts of the Public Health Service and the immigration authorities to keep typhus from entering the United States. Immigrants are coming to America by the thousands, fleeing the terrors of typhus-stricken European countries. No efforts are made to insure the cleanliness of these people before they leave the foreign shores. They reach our great congested seaports harboring the vermin of Europe. America is endangered by this influx of foreigners unless our public officials are able to completely meet their duties. Only recently, a group of immigrants harboring typhus-infested vermin came from Boston to New York. The situation is therefore one of gravity to American cities, and it is important that public officials throughout the country should know the underlying principles which are involved.



THE CARRIERS OF TYPHUS
Female and male body louse greatly enlarged

The Cootie Carries Disease

During the Great War we all heard a great deal about the cootie, the common name for the human body louse (*pediculus corporis*); but the general public thought of the cooties either as a cause of extreme annoyance to the soldiers, or as a subject for humor. Little did the majority of people recognize the fact that the cooties were the actual carriers of the most dreaded diseases of the war—typhus, relapsing fever, and trench fever. The war had hardly begun on the Eastern Front before typhus and relapsing fever appeared among the Russian soldiers, and these diseases were soon communicated to the Germans, Roumanians and Serbians. The Serbian nation was almost wiped out by typhus. Roumania was the next to suffer. Diseases carried off more lives than warfare. Medical science knew that lice could carry these two diseases and they knew the organism of relapsing fever, but there was much to be learned about both. The one striking feature was this—that wherever a complete campaign of cleanliness could be carried out, the diseases disappeared.

Later, on the Western Front, a new dis-

ease appeared, which baffled the physicians of all the armies. It was called trench fever, and became the greatest disabling disease of the armies in France. Months passed by before this disease too was finally placed as louse-transmitted, and even to this day the medical world is not absolutely certain as to the identity and classification of the organisms of either trench-fever or typhus fever.

Medical research has also added numerous other blood and skin diseases to the list of those carried by these noxious vermin, such as eczema, scalp diseases, eye infections, etc.

The most important things to bear in mind are these:

1. Lice carry several dangerous diseases, which do not normally occur in America.
2. Typhus and trench fever can be carried only by lice.
3. The louse does not inoculate the disease. Inoculation occurs in this wise: The louse takes up the disease organism by sucking the blood of the patient. The organism passes through certain stages of its evolution in the body of the louse and is passed out of the louse body in its excreta. The excreta fall on the body of the human host. Irritation of the body from the constant blood sucking causes the patient to scratch until he often draws blood, and in so doing he scratches into the blood minute parts of crushed lice or the excreta which covered his flesh. Or when the lice become very numerous the body is covered with infected excreta, and in the act of feeding they inoculate into the blood the organisms lying on the surface of the body.

Delousing

Bathing and complete change of clothing will free a person of the vermin. But there must not be further contact with other infected persons. This means that all suspects must be cleansed in groups. The war gave rise to the development of very satisfactory large-establishment bathing institutions, and there is much to learn from these practices for the benefit of our modern city sanitation.

The usual army practice is to build a large bath-house equipped with steam sterilizers. The suspects to be deloused file in at one door; surrender all valuables, metal objects, and contents of their pockets, which

are placed in bags or lockers for which they receive numbered tags; and receive a large clothing bag. They enter the disrobing room and remove all clothes, which they place in the bag and turn over to the officers of the sterilizer room, receiving a numbered tag in return. They first go to the barber shop and have the hair and beard clipped, although this could be avoided by the use of longer processes. They receive towels and soap and then pass into the baths, where they give themselves a thorough cleansing, often being sprayed with kerosene emulsion to kill eggs and crab lice concealed in the hairy parts of the body. On entering the robing room they surrender one tag and receive the bag of clothes, which have been steam-sterilized. On passing out they surrender the other check and have their valuables returned. This is a process developed to enable the officials to handle armies in a day, but it has its disadvantages when looked at from a municipal standpoint.

Steam sterilization, as practiced, may and undoubtedly does kill the germs and lice, but the majority of lice-infected people are filthy as well. Often they have not changed garments for months or years. Steam disinfects but does not cleanse. If the immigrant is to receive back his clothing, it should be returned fit to wear in his new land. There are two processes requiring barely half an hour longer which insure cleanliness as well as disinfection, and leave no shrinkage or other bad effects upon the garments, such as often results from hasty steam sterilization. I should recommend in any complete delousing station the installation of modern laundry* and dry-cleaning equipment.†

Laundry Sterilization

The undergarments would go to the laundry, and be classified as flat goods, cotton and wools. These may be washed in the wash-wheel by the following formulæ:

1. Flat goods.—a. 5-minute cold rinse, with soda.
- b. 10-minute suds, 160° to 180°F.

* W. D. Pierce, R. H. Hutchison, and A. Moscovitz, 1919, Government Report on "Laundry Machinery—Its Adaptability to Various Requirements of Disinfection and Disinsection." *National Laundry Journal*, Chicago, vol. 81, No. 1, pp. 4-14, Jan. 1.

† R. H. Hutchison and W. D. Pierce, 1919, "Studies on the Dry Cleaning Process as a Means of Destroying Body Lice." *Proceedings of the Entomological Society of Washington*, vol. 21, No. 1, January.

- c. 15-minute suds, 165° to 180° F.
 - d. 5-minute rinse, hot.
 - e. 5-minute rinse, hot.
 - f. 5-minute cold rinse, with blue.
 - g. Extract and iron.
 - 2. Cotton underwear.—the same without blue.
 - 3. Khaki.—a. 10-minute suds, hot.
 - b. 15-minute suds, hot.
 - c. 5-minute rinse, hot.
 - d. 5-minute rinse, hot.
 - e. 5-minute rinse, cold.
 - f. Extract and press.
 - 4. Woolens.—a. In the washer, run a current of steam fifteen minutes, revolving cylinder every five minutes, and discharging water of condensation every five minutes. Remove the garments and shake until almost dry. This requires only a few shakes.
 - b. Submerge in water at 165°F. for 20 minutes without motion, except a few revolutions every 5 minutes.
 - c. Wash fifteen minutes at 131°F. in heavy suds and light load.
 - e. Extract.
 - f. Dry in tumbler fifteen minutes, at a minimum of 150°F.
 - g. Iron.
- Steps a and b are not necessary in case a heated tumbler is available, unless the presence of very resistant spore-bearing bacteria is suspected.

Dry Cleaning Sterilization

The outer garments can be laundered in many cases without injury by these processes, but dry cleaning is preferred. This is carried out by the following processes:

- 1. Wash in benzol, naphtha or gasoline of which the specific gravity is not less than 56° Baumé in rotary washer wheel, using one gallon of cleaning fluid for each two pounds of goods; two ounces of standard dry cleaning soap for every 10 pounds of goods; one ounce of 26 per cent ammonia to every 25 pounds of goods. Wash 30 minutes in new, distilled or clarified fluid.
- 2. Extract 3 minutes.
- 3. Rinse 15 minutes in new or distilled fluid.
- 4. Extract.
- 5. Run in dry tumbler at not less than 160°F. for 30 minutes.
- 6. Press.

The Lice Problems of Our Cities

No American city is free from the necessity of delousing operations with certain portions of its population. The immigrants

are feared because they bring infected vermin from abroad. If they come in uncleansed, they mingle with others in the lower strata of society who also harbor lice, and soon the infection is spread. In every locality you will find slums where filth and vermin abound, and from such places frequently come those who are consigned to the jails, hospitals, and asylums, or those who seek shelter in municipal lodging-houses and missions. Here they come in contact with other unfortunates who may be cleanly, but cannot long remain so with such contact.

It is the rule in many cities, and should be in all, that all persons admitted to these institutions be subjected to careful inspection and if necessary be put through a complete delousing treatment. This is one way in which the city can reduce louse infection. Public responsibility should point out one further step. Where louse infection is found, sanitary inspectors should be sent to the source, if it can be learned, and thoroughly cleanse the premises. If we let typhus into the country, such a course will be imperative. Prevention is far easier.

But there is another place where the city can reach the louse problem—the public schools. Here we have to deal mainly with the head louse, but many infectious diseases of children are transferred by lice through contact of hats in cloak rooms. Periodical inspection of heads is practiced in the public schools of some cities where large numbers of foreigners live. We must not stop with inspection. The lice must be removed. Instructions printed in various languages can be sent the parents, or the children can be treated at school. For the safety of the remaining children, a large city could afford free clinics for delousing. One of the principal methods in use is to wash the head with warm water and soap containing kerosene.

The main burden of this article is that immigration is introducing dread diseases to America and necessitating a greater vigilance on the part of American municipal authorities as regards louse occurrence when it comes within their powers to act.

The Human Element

I have no doubt the public have often wondered how the Government studied its cootie problems. In the army men volunteered to become infected subjects in order

that the medical men could study the insects in relation to disease. But the Bureau of Entomology also conducted many important studies upon the life history and control of the lice.

These experiments were difficult at first because of the scarcity of available subjects, but finally two cases were brought to Washington by an inventor who wanted tests made on the delousing value of his invention. He went up into the woods of Wisconsin and found a lumberjack whose clothing was filthy and so lousy that the seams were white with eggs. He hired an old Irishman whose boy was overseas to wear these clothes to Washington in order to keep the vermin alive. He also found an old man vagabond who had wandered the face of the earth and had a moderate infestation. This pair arrived suddenly in Washington and had to be taken care of. The Irishman was hired at \$5 a day to serve as host for the louse experiments.

He considered it a great honor that he could serve his Government and help solve the problem of relieving the distress of his son and other boys overseas. He suffered greatly from the blood sucking, but was brave. As quickly as arrangements could be made, the lice were confined to little boxes strapped to his arms, and only able to bite him through chiffon cloth. He could then dress in clean clothes and keep his body clean and wholesome. The lice laid their eggs on cloth in the boxes and each day the eggs were removed to incubators where they were kept until ready for experiments. Part of his service was to visit the jail each day and examine all prisoners, securing the garments of the infected in order to obtain further materials for study. This whole investigation was naturally unpleasant for all concerned, but the lives of millions were at stake upon the proper knowledge of the relationship of lice to disease, their habits and control.

Assessments for Improved Pavements

THE city of Hartford, Conn., pays one-third the cost of improved pavements, and two-thirds of the cost is assessed against the abutting property, the trolley company paying the entire cost of the pavement included within the tracks and two feet outside of the outer rails. When a business street which bears only local traffic is paved, the customary method of assessment appears fair, but it is a question whether or not such a division of cost should apply on main highways bearing inter-city or even inter-state traffic.

In the summary of a questionnaire sent to many cities throughout the country, Nelson P. Lewis, formerly Chief Engineer of the Board of Estimate and Apportionment, New York City, showed that 45 per cent of the cities heard from assessed the full cost of the pavement against the property owners; 15 per cent assessed two-thirds of the cost; 9 per cent assessed one-half of the cost, and 15 per cent made no assessment whatsoever against abutting property.

A similar variation exists in regard to paying for repaving a street. Some cities allow the assessments to be paid in instal-

ments. In Hartford, Conn., if the assessments are not paid within a stated time, a lien is placed against the property and 4 per cent interest charged. This method of assessment is prescribed by the city charter, and is generally considered faulty and inequitable. It differs from the method of assessment established by other public improvements in preventing the Board of Street Commissioners from extending the assessment to affect all property benefited by the laying of the pavement. Obviously, when a main thoroughfare of considerable length is paved, properties on tributary streets are also benefited to a considerable distance from the main street and should in equity bear a portion of the cost of the improvement. Under the charter provision, however, the Board of Street Commissioners in Hartford has no option but to confine the assessment to those properties fronting on the street which is paved. It is expected that an amendment to the charter will be secured from the State Legislature to give more latitude in the making of assessments against other property benefited by the improved pavements.

Simplifying Zoning

Exemplified in the Completed Ordinances for Mansfield, Ohio, and East Orange, N. J.

By George B. Ford

Director, City Planning Department, Technical Advisory Corporation of New York

ZONING is far too young yet to become stereotyped. As to its possibilities for usefulness, only the surface has been scratched. Few of its problems have really been solved. Nor can zoning be standardized. Every town has its own personality, its own particular problems. Obviously, each demands a special treatment. A scientific study of the practical daily operation of existing zoning ordinances has suggested many possibilities for simplifying new drafts and making them come nearer solving the local problems.

We Must Pool Zoning Experience.—Why accept any previous solution on faith? The fact that in New York City and elsewhere fifty possible solutions of the various problems encountered were eliminated for every one finally adopted does not mean that the one best way has been found, by any means. Far from it. All of us who are having experience with zoning must pool our findings. Thus it is with the hope of drawing constructive criticism that this article presents the attempts made to get down to the most practical solution in the recently completed zoning ordinances and maps for Mansfield, Ohio, and for East Orange, N. J.

Mansfield, Ohio.—The two cities are radically different. Mansfield is a rapidly growing industrial city in central Ohio, at the crossing of the three trunk line railroads, with a serious flood problem as one of the disadvantages, and with charming rolling hills for residential development as an extreme advantage. It covers $4\frac{1}{2}$ square miles, has nearly 30,000 population, and far more alleys than streets. No building is over four stories high and very few over two and a half. There are very few apartment houses or tenements, no brick rows, and very few semi-detached houses, but a growing number of two-family houses. The lots run from 40 to 60 feet wide and from 120 to 180 feet deep, with alleys at the rear. In the center of the town there are several hundred houses built on the 12- to 25-foot alleys

East Orange, N. J.—East Orange has long been one of the best residential suburbs around New York City. The commuter predominates. The city covers 4 square miles and has over 50,000 population. Broad streets, arched by fine old trees, with homes free-standing, setting back 25 to 60 feet from the street line, have characterized the city for years. There are few industries, and most of the citizens sincerely hope there will never be any more. The great menace, however, is the apartment house, generally four stories high and sometimes eight, built right up to the side property lines, ignoring the setback building line, invading one good single-family, detached-house block after another, settling like a blight and vitiating the surrounding area. There are nearly 75 of these apartments already. The problem is to restrict their spread to the most logical streets.

A Single Map with Coterminous Districts.—In both cities the first question asked was, how to simplify the zones and the zoning map. The current practice of having five separate maps—one each for the use of buildings, their height, their area, their setbacks, and the fire limits—with from three to eight classes of districts on each map, is most confusing and wasteful for all concerned. After study it was found quite feasible in both cities to combine all five maps in one, with a total of only six types of coterminous districts. Every need is taken care of without undue strain. These are the first cities in which all this has ever been done.

Only Six Types of Districts for Mansfield.—In Mansfield there are only two residence types: one for one- and two-family detached houses not over two and a half stories high and setting back at least 50 feet from the center line of the street; the other to include apartments or tenements not over three stories high, semi-detached, and setting back at least 45 feet from the center line of the street. Of the three business types, one called "Local Business" corre-

sponds in its height, area and setback provisions to the first residence type; the second, called "General Business," corresponds to the apartment house type but may be four stories high; while the third, called "Extra Business," differs from the last type only in that buildings may go to 100 feet in height. This latter exception, while normally contrary to the best interest of a city like Mansfield, was necessitated by special conditions in a few blocks at the center of the town. There is only one industrial type which corresponds in its height, area and setback provisions with the General Business class. A Non-Residence class proved impractical. The revised Fire Limits include the General and the Extra Business districts and part of the Industrial.

Only Six Types of Districts for East Orange Also.—In East Orange there are three residence types. The Small Volume Residence type, which is limited to single-family, detached homes, not over two and a half stories high and setting back at least 50 feet from the center line of the street, covers, at the request of the property owners affected, nearly half of the city. The Medium Volume Residence type permits two-family and semi-detached houses up to three stories high and setting back 40 feet or more from the street line. The Large Volume Residence type permits apartments and tenements to any height provided they set back correspondingly from the street line with a maximum of 40 feet from the center line of the street. The two business types are "Medium Volume Business," which must be purely local in character and corresponds in yard, court and height provisions to the Medium Volume Residence class, while the Large Volume Business class corresponds to the apartment class. The Large Volume Industrial type corresponds in its height and area provisions with the Large Volume Business type. No Non-Residence type proved feasible.

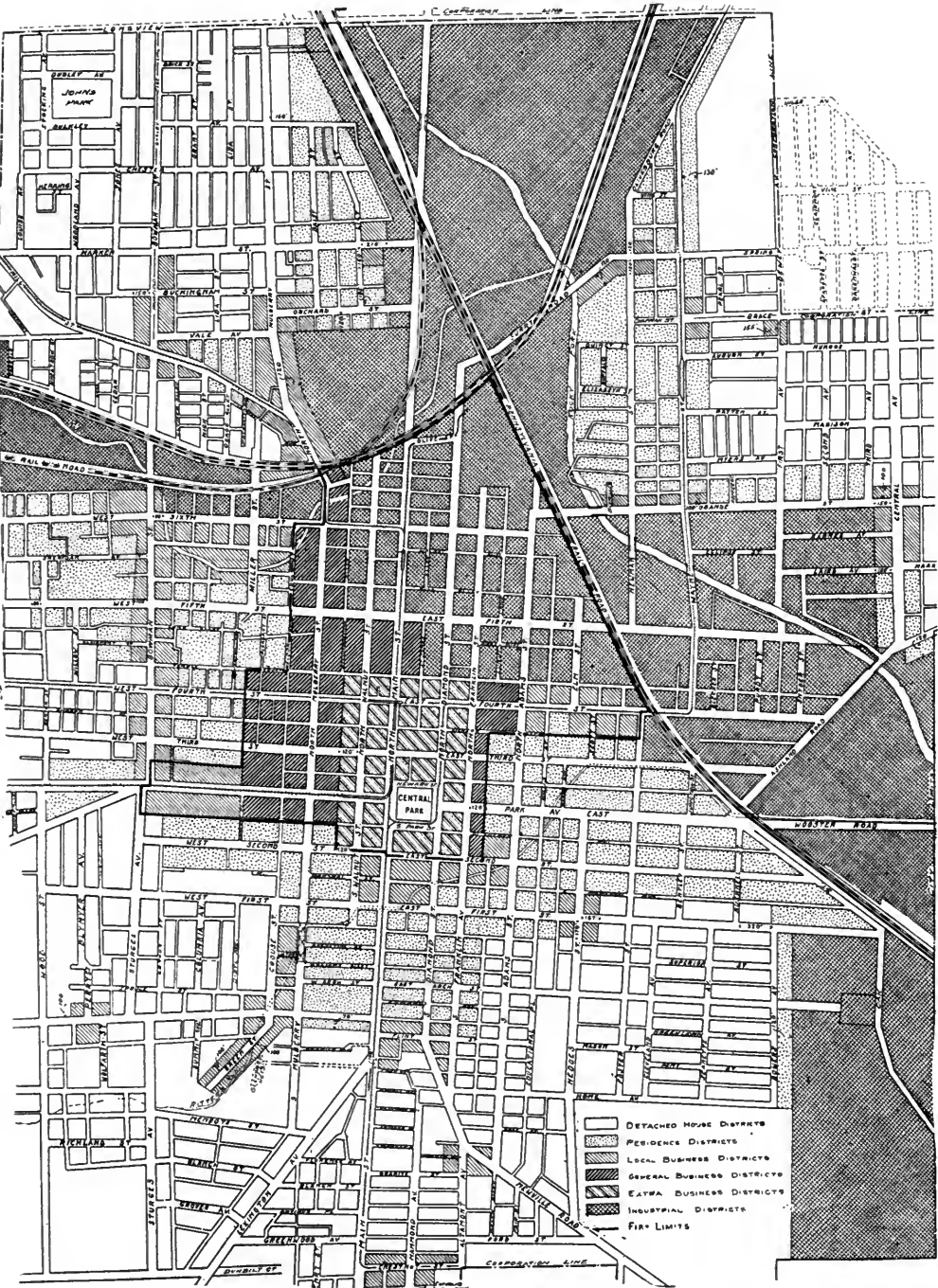
Setback Building Lines.—As to setback building lines, instead of creating a separate map or establishing a legal setback line based on the average of all existing setbacks within the blocks, it was felt that with a view to their certain recognition by the courts as a proper exercise of the police power, they should be fixed for each type of district to correspond with the side yard and rear yard requirements. That is why setbacks were established at 50, 45, 40 and 30

feet from the center line of the street, with the option of coming 10 feet nearer to the street on the ground story. In both cities, even in business and industrial districts, above the ground story the buildings must not approach nearer than 30 feet to the center line of the street. In East Orange in the main business district this has been increased to 40 feet. Where the existing buildings already set back further than the above prescribed building lines, an additional setback building line is established by providing that each new building shall set back a distance equal to the average setback of the buildings within 100 feet on either side. In East Orange one frontage of a corner lot is exempt from this latter provision but all frontages must conform to the setback above established from the center line of the street. In Mansfield lots at the corners of alleys are allowed a lesser setback on the alley frontages.

Larger Yards and Courts.—In East Orange, while the preliminary draft of the zoning ordinance provided for as large yards and courts as any ordinance in the country, public sentiment was so strongly in favor of drastic restrictions that it was possible to considerably increase the required open area. So as to avoid hardship on narrow lots, the plan provided for decreasing the yard and court requirements in proportion to the narrowness of the frontage. To take care of shallow lots, no rear yard is required within 50 feet of a required setback building line. In a business or industrial district the minimum sizes of yards and courts are doubled when the building is used for residential purposes.

Percentage of Lot Area Covered.—No provision was made in either ordinance for requiring that the buildings shall not occupy more than a prescribed percentage of the lot area, because it was believed that this is a redundant and unnecessarily cumbersome addition to the ordinance. What everyone wants is adequate light and air in each room, and if the height and area provisions are properly worked out, they alone are sufficient to secure it.

Number of Families per Acre.—The plan purposely has not restricted the number of families per acre because this is regarded as an unnecessary addition difficult to administer, for if the height and area provisions are carefully worked out, they will automatically control the density of popula-



CENTRAL PORTION OF THE BUILDING ZONE MAP PREPARED FOR THE CITY PLANNING COMMISSION OF MANSFIELD, OHIO

tion in each type of district.

Public Garages.—Virtually all zoning ordinances have begged the question of public garages by leaving the control of each case as it arose to the Board of Zoning Appeals. This has naturally caused much unnecessary work, and it has been very difficult to avoid the accusation of invidious discrimination. Both plans have therefore tried to establish in the text of the ordinance exactly where public garages could be located and under what conditions. In both Mansfield and East Orange the public has quite generally accepted the following conditions under which public garages may be established in business districts: No part of the garage shall be within 25 feet of any street. An entrance driveway shall be at least 15 feet wide. There shall be no opening in any side wall, rear wall or roof within 15 feet of any side or rear property line. The number of mechanics and the amount of mechanical horse-power used are limited. No repair work shall be done in front of the garage. In Mansfield no oil filling pump other than within the public garage shall be located except on the curb so that cars will not have to cross the sidewalk.

Codifying with the Building Code.—To avoid the difficulty prevalent in all cities of having a number of different laws and ordinances affecting building construction and the use of property, we have arranged in both East Orange and Mansfield to revise the building codes and bring them up to date, putting into them everything that has to do with fire prevention or the construction of buildings, while everything that has to do with the use of property or the layout of buildings is put in the zoning ordinance. In both cities all ordinances that affect buildings and the use of property are being published in one volume with a common index. Thus, for the first time, the builder, architect, real estate man or owner has only to turn to one source to find all regulations with regard to construction or the use of property.

Preliminary Data.—In both cities a very careful study was made of essential data preliminary to zoning. Unnecessary work

was suppressed and an effort was concentrated on a careful selection of the data without which reasonable zoning is impossible.

In preparing the Mansfield zoning map, it was extremely useful to indicate on a map, building by building, into which type of proposed zoning district each existing building would normally fall.

City Planning Survey Essential to Zoning.—Most fortunately, in both cities quite complete city planning surveys and studies had been made before zoning was started. The zoning commissions in both cities made constant reference to the city planning studies, as they appreciated strongly their vital effect on zoning.

Economic Studies.—In connection with industrial surveys, such as E. P. Goodrich has made for St. Louis and Nashville, a careful study has been made of the relative space and intensity of development needed for each type of use of property. This has meant various studies as to the number of people employed per acre in each type of industry or business, the number of people housed per acre in each type of housing development, and the local or general shopping space needed per family. By an adaptation of these principles to Mansfield it was possible to determine scientifically the relative amount of space needed for each type of district and the relative location of the various types.

Getting It Over.—In both cities the planners worked from the beginning with all the cards on the table. From the beginning the projects were talked over with the public in general and the real estate men in particular. They continuously helped with suggestions. In Mansfield the building trades unions are so interested that they have arranged to print the combined zoning ordinance and building code at their own expense. That it pays to take the public into one's confidence is proved by the fact that in East Orange the ordinance has been adopted unanimously by the City Council and its success has already brought about an urgent demand for the completion of general city planning.

Specifications for Brick Pavements, Subgrade and Curbing

New Specifications of National Paving Brick Manufacturers Association Offer Numerous Alternatives of Methods and Materials

THE chief object sought by the publication of the new set of specifications for brick pavements and their essential parts by the National Paving Brick Manufacturers Association is to definitely call attention to the variety of construction methods and materials that should be studied and may be drawn upon before a type of brick pavement for any single improvement project or portion of project is selected.

Following is an abstract of a major portion of the specifications:

Underdrainage.—Alternate methods of underdrainage for city streets and country roads under average and worse conditions are outlined.

Grading.—All vegetable matter and soft earth or quicksand which will not compact by rolling should be removed, and earth should be applied in layers not exceeding 12 inches. The use of 10-ton, self-propelling road rollers is recommended, and the surface of the subgrade should be tested immediately before the artificial foundation is laid.

Concrete Materials and Mixing.—Alternate specifications for use with broken stone, gravel or crushed slag are provided, and a special note on mixing is included.

Longitudinal Expansion Cushions (Premolded).—Recommendations are given for the use of monolithic type, longitudinal expansion cushions, and a note advising against the use of transverse joints in the surface or base of the roadway, except at abrupt grade changes or crowned roadway intersections.

Longitudinal Expansion Cushion (Poured).—The use of the poured cushion is recommended where cement grout filler is used.

Stone Curb and Header.—Joints not exceeding 3/16 of an inch in width are specified.

Concrete Curb and Header.—It is recommended to use a 1:3:6 mix for concrete headers, and for all concrete curb and header work 5 days of covering are recommended.

Integral Concrete Curb.—This should be built at the same time and with the same materials mixed with similar proportions as the concrete base.

Rolled Gravel Base.—Gravel should consist of durable particles, together with clay or other suitable binding material, 100 per cent to pass a 3-inch screen, not more than 75 per cent to pass a ¾-inch screen, and not more than 30 per cent to pass a No. 10 screen; the gravel to contain not less than 10 nor more than 20 per cent by weight of clay or other binding material. The gravel should be spread to a depth of approximately 30 per cent more than the finished rolled depth, and if dumped on the subgrade should be sufficiently harrowed to loosen cores formed by dumping.

Rolled Gravel Base and Shoulders (Country Highway).—Specifications for gravel same as for rolled gravel base. For rolled shoulder the width should be 12 inches, and the depth as built up upon the extended base should equal the combined depth of the brick surface and the bedding course as shown on the plans. Shoulder should be thoroughly compacted by rolling, using the same roller, if practical, as specified for the brick surface.

Rolled Stone Base and Shoulders (Country Highway).—Broken stone for the base should consist of run-of-crusher material of such sizes that all will pass 3-inch circular openings in a revolving screen, the stone to be spread to a depth of approximately 30 per cent more than the finished rolled depth, using a 10-ton roller.

Rolled Slag Base.—Specifications include the use of crushed slag in such sizes that all will pass 3-inch and be retained on ¼-inch circular openings in a revolving screen. Other requirements generally the same as above.

Rolled Stone or Slag Base (Coal-Tar Binder).—The use of homogeneous tar with a specific gravity of 1.12 to 1.18 and 90 to 96 per cent total bitumen is recommended, not exceeding 1½ gallons per square yard.

Concrete Base.—The use of a 1:3:6 mixture is recommended; if combined aggregates are used, 1 part of cement to 7 parts combined aggregate provides for protection in freezing weather.

Green Concrete Base (Monolithic Type).—Proportions of concrete same as above. The use of a mechanical tamping template, using curb, street railway track or side forms as guide rails is advocated, also the use of longitudinal expansion joints.

Worn Macadam or Gravel Base (Reconstructed).—The existing road surface must be thoroughly cleaned of all dust, earth or refuse, then scarified to remove all depressions or irregularities, reshaped and compacted to uniform and thorough density, using screenings or sand not exceeding ¼-inch in diameter as a binder. Rolling with 10-ton roller should begin at the shoulders and continue backward and forward until the center of the roadway is reached.

Worn Concrete Pavement Base (Reconstructed).—Where existing concrete is inadequate to meet the requirements of depth it should be removed and replaced with new concrete to the depth required. Damaged concrete should be replaced with new, and cracks or minor defects cleaned and filled with bituminous material or cement mortar.

Sand Bedding.—A bed of ½ to 1 inch of sand not exceeding ¼-inch in maximum grain size and containing not more than 15 per cent loam or other fine material by weight may be used. It should be shaped by means of a template, or by hand where necessary, and should not be disturbed after shaping and rolling, prior to laying the brick.

Stone Screenings or Granulated Slag Bedding.—Depth, shaping, hand-finishing, etc., same as for sand.

Cement Sand Bedding.—This should consist of one part portland cement and 4 parts sand, and when finished should not exceed 1 nor be less than ½-inch deep. Cement-sand for bedding should be premixed in the proportions specified, either by hand or by mechanical batch mixer, mixing to continue until each batch is of a uniform shade, and the quantity mixed at one time not to exceed one day's supply. Immediately after the brick are laid the surface of the roadway should be wet down thoroughly by sprinkling to insure the hardening of the cement sand bedding and the firm bonding of the brick to the bedding.

Verified Paving Brick.—Plain Wire Cut and Brick Surface.—Plain wire cut brick with square edges are recommended, measuring 3 by 4 by 8½ inches. Ends may be double beveled not more than 3/32-inch, and should not vary from above dimensions more than ¼-inch in width or depth, nor more than ½-inch in length, and should have one reasonably straight face or side as required to be laid for the wearing surface. Alternate courses of brick should be commenced with one-half brick. All joints at cross-pavements should be broken at least 3 inches. The surface of the road-base should be rolled by a 3-ton, self-propelling tandem roller, beginning at the edge of the pavement and continuing backward and forward until the center of the pavement is reached. The roller should then pass to the other side and complete the operation to the center. Rolling may then be at an angle of 45 degrees with the edge of the pavement, entirely across from side to side. This operation should then be repeated in the opposite direction, the final rolling to be parallel with the center line of the roadway. Portions of the surface not accessible to mechanical rolling should be hand tamped. Depressions exceeding

$\frac{1}{4}$ -inch as tested with a 6-foot straight edge laid parallel to the center line of the roadway should be corrected. Joints should be filled in all brick laid in any day's work before the close of that day's operations.

Vitrified Paving Brick Block Size—Plain Wire Cut and Brick Surface.—Specifications same as for standard size, except regarding dimensions of brick, which are in this case $3\frac{1}{2}$ by 4 by $8\frac{1}{2}$ inches.

Vitrified Paving Brick Block Size—With Lugs and Brick Surface.—Specifications identical except for description of brick, which measures $3\frac{1}{2}$ inches in width by a specified depth and $8\frac{1}{2}$ inches in length, and should be provided with not more than 4 nor less than 2 projections on one side, which should extend from the body of the brick not more than $\frac{1}{4}$ - nor more than $\frac{1}{8}$ -inch.

Oil Asphalt Filler (Squeegee Method).—Homogeneous asphalt fillers free from water and which do not foam when heated to 200 degrees C. are specified. Flash point, melting point, penetration, loss on evaporation, ductility, total bitumen, per cent of total bitumen, reduction in penetration are specified, with the nature of the tests to be applied. Bricks shall be swept clean and dry when filler is applied. All bricks shall be filled and a surface dressing applied on the day of laying, and filler shall not be applied if the bricks are wet or the air temperatures are such that the filler will not flow freely to the bottom of the joint. Filler shall be removed from the heater and applied hot to the pavement before cooling. It shall be worked into the joints by means of an iron squeegee operated slowly backward and forward at an angle with the joints. Squeegee irons are to be kept hot

and due precautions taken to completely fill the joints, squeegeeing to continue until the joints are full and a thin coating of asphalt remains upon the surface of the brick. A thin coating of dry stone screenings, sand or granulated slag shall be spread upon the surface of the pavement, providing the wearing surface of the brick is wire cut. Top dressing shall be of such sizes that all will pass a No. 4 sieve. As soon as the dressing is spread, the surface of the pavement shall be rolled thoroughly to bed the dressing into the asphalt coating.

Cement Grout Filler (Machine Mixed).—This specification provides for filling joints of the brick with a cement grout composed of one part portland cement to $1\frac{1}{2}$ parts sand. Sides and ends of the brick in the joints shall be thoroughly wet with gentle sprinkling before the joints are filled. Filler shall be mixed in and applied from a mechanical batch mixer of the portable type, having a 2-cubic-foot capacity. Two applications of the filler are recommended, the second made with less water to produce a filler of thicker consistency. The filler shall immediately be worked into the joints by means of rubber-edged squeegees, which shall be operated at an angle with the joints. The roadway shall be closed to traffic for not less than 15 days after grouting is completed.

Sand Filler.—The use of a dry sand, such that it will all pass a No. 12 sieve, is recommended, sand to be spread upon the surface to a depth of not less than $\frac{1}{2}$ -inch and then swept into the joints, completely filling them to the bottom. Sweeping may be done by stiff or by weighted brush drags having fine twigs horse-drawn over the surface of the pavement, an excess of sand to remain upon the surface.



DEMONSTRATION OF THE VOLUME OF WATER THAT CAN BE THROWN BY A MODERN MOTOR PUMPER

School Cafeterias as a Community Asset

Hot Lunches Are Beneficial to Rich and Poor

HERBERT HOOVER has said, "I believe that the definite institution of supplementary child feeding in public schools in certain places is a necessary part of municipal endeavor." The aim of the school lunch is two-fold: to meet the food requirements of the child, helping to lay a foundation of physical strength upon which the structure of mental training can be effectively built; and to serve as an educational factor in instilling wise food habits, offering an opportunity for training in courtesy, and providing a laboratory for the practical demonstration of allied subjects of study, such as cooking, hygiene, and buying. One can picture the day, not too far distant, when the plans for every school building will include equipment for kitchen and lunch room and the school lunch will be an important and assured adjunct to school

work, correlated with the educational scheme in ways as yet undeveloped.

According to Emma Smedley, Director of Public School Lunches, Philadelphia, Pa., the school lunch has thoroughly proved itself in Philadelphia and the system is developing as rapidly as physical conditions will permit. At the present time, uniform school lunches are being served in all of the 16 secondary schools in the city, including the 10 high schools and 3 annexes to high schools, the Philadelphia Normal School, Trade School for Girls, and the Junior High School, and in 30 elementary schools, or in 46 out of the total of 213 public schools of the city.

The Most Economical Plan

The present solution of the midday luncheon problem has been reached in many



THE WELL-EQUIPPED KITCHEN AT ACADEMY HIGH SCHOOL, ERIE, PA.

high schools by the cafeteria plan. The school cafeteria came into being because it is the most economical basis of operation and makes it possible for food to be served at a minimum cost. The initial cost of installation need not be large; in fact, all things considered, it can be surprisingly low. It must, however, be something more than merely an eating-place, because in order that it may properly fulfill its mission, it should be carefully thought out, correctly installed, and fitted to the particular requirements of the school it is to serve. The type and size of the cafeteria will depend upon the number of persons to be served, the space available, the size of the menu, and the amount of the appropriation.

The thought of monetary profits is hardly ever considered in this connection, but some schools in the more well-to-do sections of cities try to make the school cafeteria self-sustaining. For example, they charge 10 cents for a bowl of soup, 5 cents for a sandwich, 5 cents per portion for pies, cakes and puddings, and so on. The food in the school, however, should be of the very highest class, well cooked and well served. There should be a fair range of variety, and everything should be selected in strict accordance with the dietary needs of vigorous young bodies and minds. Little if any loss should be incurred under proper management when this plan is used. In this instance the initial cost of the equipment would be the only appropriation needed from the city.

The Hungry School Child

In the grade schools, especially of the larger cities and smaller industrial towns, the children in many instances have an early breakfast or a breakfast consisting of improper food values. As a result, many become ill and faint before the noon hour. These children should have a wholesome light lunch in the middle of the forenoon, as well as a school lunch at noon. The morning recess lunch should consist of a hot drink—cocoa, milk, etc., with a cracker or cookie. This could be served for a penny or two. A more elaborate lunch could be served at noon, also for a few cents.

In other localities, where the child receives a proper morning meal, he is obliged to eat a cold lunch on his return home at noon, or, as in the smaller towns and in country community schools, the children live too far to return home for luncheon,

and they usually carry cold, unsuitable food from home in boxes, paper sacks, etc.

Again, in many places the older members of the family return for the midday meal, while the children are not released from school until 1:30 or 2 o'clock, which makes it necessary for the children to go without warm food from 8 or 8:30 in the morning until their return home to a cold lunch or a warmed-over meal, which, because of the child's hunger, is eaten rapidly, overworking the stomach.

The Food and How to Serve It

The important place which the school lunch has assumed in the life of a school child has led the Home Economics Department of the United States Department of Agriculture to suggest a number of easy menus for the school lunch. The menus, which include five, are as follows:

No. 1. Vegetable-milk soup, crackers, rolls, fruit and plain cake

No. 2. Meat and vegetable, bread and butter, sweet chocolate

No. 3. Boiled custard, lettuce, sandwiches, fruit and cake

No. 4. Dried codfish chowder, crackers, fruit, maple-sugar sandwiches

No. 5. Bean soup, crackers, baked apples and sponge cake

Some of the grade schools of Chicago serve a lunch of a bowl of soup and a sandwich for a penny only. This plan is probably essential only in the larger communities. The cost of this system is almost wholly derived from the city appropriation.

In the district or community schools the problem is different. The conveniences for operating a lunch room are in most cases not to be had, and the necessary help cannot be as readily obtained. If the pupils are provided with one warm dish, or more, to supplement the cold lunch, it is quite satisfactory. It is also possible to obtain fresh milk from neighboring farms to take the place of that brought in the lunch basket. In the country community school the teacher or principal becomes the directing force in the preparation and the serving of the lunch. The actual preparation of the food may be done by older girls or by the domestic science cooking class under the personal supervision of that instructor, or, if the school has not yet established a cooking class, the preparation of the school lunch could well constitute the work of such a



SERVICE COUNTER OF CAFETERIA, ACADEMY HIGH SCHOOL, ERIE, PA.

class. In most school buildings there is generally a separate space that can be used as a lunch room. This is more satisfactory than serving the children at their desks, although that can be done if managed carefully.

It is surprising how many children are obliged to lunch away from home. Disregarding the figures available for the large cities, and referring only to county and smaller town communities, statistics show that two years ago 254,504 school children in the state of Illinois alone carried their lunch to school daily.

In the community schools the type of equipment is not very extensive. There, however, as in the high school cafeteria,

local conditions will indicate what is most suitable. The equipment for the community lunch room is usually paid for by the school board or some organization of parents and patrons formed for purposes of coöperation with the schools. Sometimes the pupils themselves raise the necessary money by entertainments given in the school or by various other means. It is almost universally agreed, however, that the cost of the food should be covered by its sale, and that this can be done if a charge of a few cents is made for each dish. There is no good reason why any school should be without its lunch room.

ACKNOWLEDGMENT.—Illustrations courtesy of Albert Pick & Company, Chicago, Ill.

Increasing the Efficiency of Public School Pupils

Improving the heating and ventilation of our schools will greatly increase the efficiency of the pupils. It is estimated that 25 per cent of school efficiency is lost through defects in these systems.

—From a statement in *Public Health*, issued by the Michigan Department of Health.

Water-Waste Restriction in Boston

IN one of the many interesting papers read at the annual convention of the New England Water Works Association last September, Frank A. McInnes, Division Engineer, Metropolitan Water Board, Boston, gave a discussion of the measures adopted in Boston to restrict the waste of water. In 1919 the daily average consumption in Boston was 89,652,400 and the daily per capita consumption was 111 gallons. The manner in which the Metropolitan supply is subdivided for the various districts showed readily that the Charlestown district was probably the greatest offender from the point of view of waste. This district has a population of approximately 34,500, a pipe mileage of 31.9 miles, and an unusually large industrial consumption. It is very thickly settled and completely metered.

A contract for a waste survey was made with the Pitometer Company, New York, which included a test of the Venturi meters measuring the flow into the district, the division of the district into sections, and the measurements of the flow in each section. In addition, a detailed investigation was made between May 10 and July 30, 1920, of all sections where excessive waste was indicated and actual leaks were located, including a check on all large consumers for the purpose of determining unauthorized use of water, and a test of all fire pipe and meters larger than 3-inch.

The result of this work was a saving of 955,000 gallons daily in an average consumption of 6,582,540 gallons, or about 14 per cent. The leaks located and stopped are given in the table below:

In addition to these leaks, one 10-inch, one 8-inch, two 4-inch and two 3-inch meters were found to be under-registering, some of them seriously, but in no case was the unauthorized use of water found.

Allowing an unavoidable waste of 3,000 gallons per mile of pipe per day, the present domestic daily per capita consumption of the Charlestown District is 32 gallons.

The method of work was essentially the same as that used successfully for many years in Boston, with the difference that the portable pitometer inserted in the pipe through a 1-inch corporation cock supplanted the permanently located Deacon meter and gave greater flexibility of operation. The district, approximately one square mile in area, was divided into twelve sections, the largest of which contained about 40 blocks. The average daily consumption of each section was determined by taking the mean of two 24-hour measurements, the flow into the section being through one pipe only, into which the pitometer was inserted, the section being completely isolated from the surrounding distributing system by the closing of all gates around its boundaries. If the minimum night rate was found to be more than one-half the average daily rate, it was assumed that unavoidable waste existed, and the section was subdivided to further locate such waste, this work being done at night during the period of least draft. The flow into the entire section was first measured, then the area of the section was slowly decreased by cutting out block after block as the measurement was continued; the record of the instrument showed the amount of water used in each block, and a leak of any considerable size was quickly apparent. To actually find the leak in order that it might be repaired, the usual methods were employed, the most successful of which was the use of a steel rod driven down to the pipe at intervals of about 5 feet. By listening with an aquaphone at the end of the rod, much unnecessary excavation was avoided.

	AMOUNT OF WASTE (Gallons per Day)	OUTLET
Broken 3-inch pipe.....	253,000	Following wall to river
Blown 8-inch joint.....	149,000	Underground to river
Broken ¾-inch service.....	121,000	Flowing into sewer
Broken ¾-inch service.....	100,000	Underground
Broken ¾-inch service.....	85,000	Flowing into sewer
Broken ¾-inch service.....	87,000	Flowing into sewer
Blown 6-inch joint.....	38,000	Flowing into sewer
Split ¾-inch service.....	30,000	Underground
Broken 1¼-inch service.....	35,000	Underground
Split ¾-inch service.....	27,000	Underground
Hydrant not seated.....	30,000	Underground

The Place of the Library in the Community

By Margaret Jackson

Instructor, Library School of the New York Public Library

"I HAVE found it helpful to think of the public library as that specialized agency of organized society which collects, sifts, preserves, classifies and makes available the world of print, not for education alone, but for life itself, which must include, besides and beyond education, at least two other great phases of life, namely, recreation and occupation."

So spoke Dr. C. C. Williamson, Chief of the Economics Division of the New York Public Library, in an address which he made to the Indiana Library Association, and therein stated the belief of the trained librarians of the country. To the competent librarian, belief means practice.

In the same month the Wisconsin library bulletin wrote:

"Formulate your ideal of the ultimate purpose of the public library in your town; for instance, that its books and pamphlets shall be used in every home, office, school, institution and business house and that every citizen shall learn to turn to it for ideas and help in work and play."

It is impossible to have books in every home unless the nature of the home is known: native, or new Americans, or Americans in the making? If a foreign language is spoken, is it Finnish, Swedish, Lithuanian, Bohemian, Yiddish, Italian? Worcester, Mass., makes provision for its large Scandinavian population by eight newspapers in the Scandinavian languages in its free newspaper reading-room. The Immigrant Publication Society in New York, of which John Foster Carr is the head, has seen the need and met it. Los Angeles has a circle of five women, each representative of a foreign nationality, who meet at the library to suggest books in their own languages which should find a place on the shelves. In this way not only native Americans meet new Americans but new Americans meet each other.

Providence, R. I., conducts at its public library a class in citizenship which prepares foreigners for court examination and issues a folder of questions and answers that all

new voters may study. The American Library Association in Chicago has lists prepared for the use of those librarians who cannot make their own selections in foreign tongues. Self-preservation alone would make every library do its share in Americanization, and every library worth the name is doing it, either independently or by applying to its state commission for aid and instruction.

After the question of getting books in foreign tongues is met, that of how to get the foreigners together arises. Many librarians meet it through the aid of nurses, civic league workers and clergymen. Some ask permission of employers to put in the pay-envelopes of the workers slips in various tongues inviting attendance at the library. Some gain space on the bulletin boards of the factories. In the spring of 1919 Springfield, Mass., offered exhibition space for examples of the home-crafts of new Americans, and the exhibition brought 5,000 people to the library. The work of the children always brings the parents.

Foreign language newspapers are a great help.* Indeed, the newspaper editor may be the librarian's greatest ally. It is particularly helpful when foreign-language newspapers carry English translations of all their material in parallel columns. This aids the librarian in judging the content of the paper and aids the foreigner in the study of English.

Local clubs and the library go hand in hand. New Rochelle, N. Y., and Morristown, N. J., are among the libraries that work with garden clubs, and an increased love of gardening is the result. The display of flowers in the libraries leads to the use of garden books. Women's clubs have their own shelves in many libraries, and when

* THE AMERICAN CITY believes that the foreign-language newspaper problem would be simplified if a legal provision were made for printing in parallel columns English translations of all the text. Evidence uncovered in various governmental investigations indicates that some of the foreign-language newspapers have been the media for the propagation of some of the most violent attacks upon American institutions.

the Red Cross was the great club of the nation, librarians, such as the one in Bay City, Mich., arranged in the library for reading aloud there at certain working hours.

Among the special interests of libraries at present are the filing of material of current interest—pamphlets, newspaper clippings, etc., in a vertical file, and the mounting and circulating of pictures. Newark, N. J., is a leader in both directions. No library is too poor for both activities.

The museum feature of a library is an important one where the community affords no other lodging-place. Many libraries have undertaken the housing of all records of the Great War, as they have previously housed and cared for all historic records. Among the smaller libraries Stockbridge, Mass., is a worker here.

Getting books out into the rural community or to persons in districts far from library centers involves effort, and many libraries, led by the example of St. Louis, use the parcel post freely. Deposit stations are frequent. New York in its Extension Division has 550 such stations outside of its main library and branches.

Moving pictures and libraries are coming together. American ideals can be taught by good films of stories of American life to

persons who are slow to approach the book without an introduction. The National Board of Motion Pictures, 70 Fifth Avenue, New York City, stands ready to help librarians with suggestions.

One thing local libraries have not yet learned from California's good example, and that is the use of sign-posts. If we can find a railroad without asking, why not the library?

It is becoming more and more generally acknowledged that, as a simple efficiency measure, the children in our schools should be taught the use of the library. That the public can best serve its own interests by employing as librarians persons trained to help it gain education, occupation and recreation, is self-evident. No other institution in the United States can better promote the aims for which it was founded than that library which is democratic, ready to help all ages alike, sectless, patriotic, but human enough to recognize the glory and honor which other nations have contributed to life through their literature; the library whose doors are open every day of the year, which is the meeting ground for those who wish to serve each other, who believe that as the Nineteenth Century left the world a neighborhood, even so the Twentieth Century shall leave it a brotherhood.

New Jersey Zoning Regulations Upheld

A decision lately announced by the New Jersey Supreme Court in the case of Cliffside Park Realty Company vs. Borough of Cliffside Park, dismissed a suit attacking the validity of an elaborate zoning ordinance of defendant borough.

The realty company, as owner of land in the borough, asserted that the ordinance, and the 1920 supplement to the Home Rule Act of 1917, under which the ordinance was adopted, were invalid as improperly limiting the use of private property. As to the Act, the Court observes that the zoning regulations authorized by it are in express terms limited to those "designed to promote the public health, safety and general welfare." The opinion adds:

"There can be no question about the validity of reasonable regulations touching the public health and safety. 'General welfare' is a

broad phrase and perhaps would include matters not properly within the scope of the police power, but no doubt includes some that are within that scope."

Without setting forth the terms of the ordinance, the Court holds that it could not be set aside as a whole because certain parts of it might be invalid; that, in any event, plaintiff's suit was premature, in that the company apparently had not been refused permission to improve its property as desired. The proper procedure was to file plans and specifications and seek a permit, and sue to compel its issuance on issuance being refused.

To an objection that the ordinance was defective in failing to provide a penalty, the Court remarks: "In that case they are that much better off if they infringe its provisions."

The Administration of Public Bath-Houses

By Robert A. Bernhard

Superintendent of Playgrounds and Recreation, Rochester, N. Y.

THE establishment of substitutes for the "swimmin' hole," while not an intricate problem, requires some thought and a study of successes and failures. The commercial bath-house consisting of an office and a number of dressing-rooms with cracks in the wooden floors to allow water to run through, located on a natural body of water, while still in use, is out of date. Where natural water is available, pure so far as pathogenic bacteria are concerned, we have buildings of masonry, architectural masterpieces beautified with lawns, shrubs, and spacious approaches. They are equipped with laundries, dryers, sewing-rooms where the bathing-suits are kept in repair, hot and cold showers, hair dryers for women, clean floors impervious to moisture, steel lockers, and a copious display of nickeled hardware. These are impressive, not so much for the service which they give as for their beauty. They are very expensive; in fact, to-day the cost is almost prohibitive. No, they will not solve the problem of the old "swimmin' hole." They cost too much.

Protection of Clothing and Valuables

However, they have brought forward two new methods of handling the dressing problem, namely, the basket and locker methods. The first does away with protracted use of the dressing-rooms, by requiring the patron to place his clothing in a suitcase or basket and check it, thus leaving the dressing-room available for the use of others. The locker method requires that the bather, after putting on his swimming-suit, place his street clothes in a locker. It has been determined by observation that one-sixth of the time spent by women on the premises is used in undressing and dressing. Therefore, unless some local condition exists which would cause the women bathers to arrive or depart all at one time, one dressing-room would suffice for every six lockers. Women require a deep locker—one that will permit the hanging of clothes without wrinkling. Men are not averse to undressing and dressing in the locker-room; however, a few

dressing-rooms should be provided for the men who desire them.

Patrons prefer the locker method; it creates a greater sense of security, as they themselves put their clothes in a locker, lock the door, and take the key with them. There are two ways in which the bather may retain the key. One requires an elastic which can be worn around the neck, wrist, or ankle, to which the tag or key is attached. The elastics are very often given to bathers wet and unsterilized. The first condition is unpleasant and the latter dangerous. The second method makes use of a large safety pin specially constructed with a loop in one side, from which the key or tag hangs. These pins are attached to the bathing-suit and do not annoy the swimmer.

To properly protect valuables, envelopes are provided from which a portion of the flap may be torn off, to be retained by the depositor as a receipt. The envelope and the receipt are numbered alike. Each has a place for the signature, address and locker number of the depositor. He fills in the above spaces on the envelope. When calling for his valuables he writes his name, address, and locker number on the receipt in the presence of the attendant. Thus the person in charge of the valuables has four ways of detecting fraud, namely, the numbers on the envelope and receipt, the signatures, the addresses, and the locker number. The envelopes are filed numerically in a fire-proof steel filing cabinet.

The above methods of providing dressing-rooms, a safe place for clothes, and a safe place for valuables were developed in costly bath-houses but are found suitable for less costly establishments for smaller cities.

Modern bath-house construction aims at service, durability, architectural beauty, and low cost of construction and maintenance; such as the McKinley Beach Bath-House at Milwaukee, which, however, should install the locker method in place of the basket system, where six lockers are provided for every dressing-room in the ladies' depart-

ment. Practically no dressing-rooms are provided in the men's locker-room in this bath-house. The key to the locker is pinned onto the bather, and his valuables are adequately protected.

Some bath-houses provide bathing-suits, and others do not. Last year, when the executive head of bath-houses in a western city did not want to provide suits, the Board of Aldermen supplied the money necessary for them. If they are provided, they should be disinfected. The suits should conform to the requirements of the National Asso-

of violent shock, and the final wash-off. Having but one exit to watch, an attendant can recover all property which has been rented before allowing the patron to leave, provided he knows what the bather has rented.

This information is imparted by the use of tickets and punches. The doorkeeper collects the ticket when the bather is ready to leave. The color of the ticket indicates to him what the man paid for, and the punches show what he actually received. If the patron's ticket calls for a suit and a



THE MCKINLEY BEACH BATH-HOUSE IN MILWAUKEE IS AN EXAMPLE OF UTILITY AND ARCHITECTURAL ATTRACTIVENESS OBTAINED AT LOW COSTS

ciation of Park Superintendents governing private suits. Towels, soap, stockings, bathing-caps, water-wings, etc., may also be provided. It requires very close watching to prevent theft of these articles; protection is assured by having but one exit for each sex by which they can leave with their street clothes on. The exits and entrances which lead to the beach have foot-baths about 10 feet square and 6 inches deep with shower-baths running overhead, making it impossible to pass without receiving a thorough wetting. This prevents a shock when the bather enters for his swim, and washes him off when he returns to the locker-room. All three results are desirable—the prevention of theft, the prevention

towel, he will have to give the doorkeeper a suit and a towel before he can get out.

The House and Its Service

We are now prepared to follow a patron through a modern bathing-beach house. First, he buys a colored ticket, the color, as well as the printing matter, indicating the price paid. Second, he enters a one-way turnstile. After getting in, he presents his ticket to an attendant, who gives him what the ticket calls for—suit, suit and towel, etc. The ticket is punched and given back to the patron, who always receives a key to a locker. Then, if he chooses, he can check his valuables and proceed to his locker, put on his swimming-suit, proceed

through a shower-bath and foot-bath to the beach. In returning, he comes in through the shower and foot-bath, dresses, presents his blank check for valuables, signs his name, address, and locker number before the attendant and is allowed to leave, the doorkeeper collecting the ticket, locker key, suit, etc.

Having considered the service required, let us turn to the type of building needed. We must have a cashier's office, two one-way turnstiles for entrances, lockers, and dressing-rooms, supply rooms where the bathing-suits can be given out, laundry, drying-room, toilets, and, above all, a place where the little fellows under twelve can get in by themselves free. You say, "Hold on! this is as elaborate as, if not more so than, the buildings prohibitive in cost." Yes, from the point of view of service; but they cost less, as they consist of low one-story affairs with concrete floors, and sometimes

no roof; in such cases there is a wall around the locker-rooms made of concrete or stucco tile, and small gable roofs, similar to train sheds, cover the lockers and dressing-rooms and take the place of solid roofs. The rain is allowed to run on the floor and drain into the sewer. One laundry does for a number of houses. It takes only a few attendants, and can be cleaned with a hose. Durability and neatness are incorporated, but the splendor of marble and tile is dispensed with.

The beach and water should be illuminated by flood-lights placed on a steel tower, such as those at Clarendon Beach, Chicago, sufficiently high to prevent glare in the eyes of the bathers when they face the shore. Eighty feet seems to be the accepted height.

There should be a first aid station at the beach. The life-guards and attendants are usually allowed to use it for a dressing- and lounging-room when not on duty.

Mileage of Public Roads in the United States

There are now 2,273,131 miles of public roads in the United States. Of these, 10.9 per cent (a total 247,490 miles) are surfaced roads—roads other and presumably better than mere cuttings in the dirt. Rhode Island leads all the Union in good roads, with a percentage of 58.8 per cent. Massachusetts comes next, with 51.7, followed by Indiana, 42.3, Ohio, 33.8, New Jersey, 30.3, and New York, 27.9 per cent. Ne-

braska is at the foot of the list with a percentage of 0.3, representing 250 miles of surfaced roads out of a total of 80,338. Other backward states are Nevada, 0.5 per cent, Montana, 0.4 per cent, and Kansas, 1 per cent. Ohio has the greatest good road mileage, with 28,312. Nevada has the least, with 65 miles. Texas has the greatest total mileage, with 128,971, and Rhode Island the least, with 2,121.

On the Calendar of Conventions

APRIL 21-23.—WASHINGTON, D. C.

National Conference on Community Center. Address Commissioner P. P. Claxton, Bureau of Education, Department of Interior, Washington, D. C.

APRIL 27-29.—HOUSTON, TEXAS.

American Society of Civil Engineers. Secretary, Charles Warren Hunt, 33 West 39th Street, New York, N. Y.

APRIL 27-29.—ATLANTIC CITY, N. J.

Chamber of Commerce of the United States of America. Secretary, D. A. Skinner, Mills Building, Washington, D. C.

MAY 9-11, 1921.—PITTSBURGH, PA.

National Conference on City Planning. Secretary, Flavel Shurtleff, 60 State Street, Boston, Mass.

MAY 9-12.—OKLAHOMA CITY, OKLA.

Southwest Water Works Association. Secretary, V. M. Ehlers, Austin, Texas.

MAY 11-13.—WASHINGTON, D. C.

American Institute of Architects. Secretary, William S. Parker, 120 Boylston Street, Boston, Mass.

MAY 11-14.—JACKSONVILLE, FLA.

Southern Commercial Secretaries' Association. Secretary, E. B. Walker, Spartanburg, S. C.

MAY 31-JUNE 3.—PASADENA, CALIF.

National Electric Light Association. Acting Secretary, S. A. Sewall, 29 West 39th Street, New York, N. Y.

JUNE 6-10.—CLEVELAND, OHIO.

American Water Works Association. Secretary, J. M. Diven, 153 West 71st Street, New York, N. Y.

JUNE 14-16.—SAN FRANCISCO, CALIF.

National Fire Protection Association. Secretary, Franklin H. Wentworth, 87 Milk Street, Boston, Mass.

JUNE 15-17.—KALAMAZOO, MICH.

League of Michigan Municipalities. Secretary, M. Lucas, City Clerk, Owosso, Mich.

JUNE 22-29.—MILWAUKEE, WIS.

National Conference of Social Work. Secretary, W. H. Parker, 315 Plymouth Court, Chicago Ill.

The Community Court Idea and the Housing Problem

By Charles Alma Byers

THE community court idea, which, in certain respects, has been so successfully carried out, holds timely suggestions of value. Heretofore, in its true interpretation, it has been employed mainly by individuals for investment purposes, and generally with very satisfactory results. It is, however, deserving of much broader and more extensive uses. Certain industrial housing projects have been carried out on a somewhat similar plan, but the true community court idea has rarely, if ever, found interpretation in industrial centers, or elsewhere, as a studied attempt at solving any housing problem on a large scale.

The community court is especially well represented in the accompanying illustrations. As commonly planned, it consists of an arrangement of small, individual homes grouped about a community courtyard, toward which each of the units is faced. Usually there will be a row of houses on either side of this courtyard, with perhaps either a single or a duplex house facing it from the rear, but occasionally, especially when the site selected comprises a comparatively narrow plot of ground located on a corner of a block, one of the rows will be omitted, leaving a sort of "L" arrangement.

The courtyard, since the several units are designed to face it instead of the public thoroughfare, often suggests a short, private street. It is, however, invariably laid out as an attractive garden, with green lawn, shrubbery and flowers, not only to produce a charming landscape effect viewed from the

street, but to give the houses a delightful setting. It is traversed lengthwise by one or two cement-paved walks, with individual walks branching off to the various units, and at the street entrance to the grounds there is often created something in the way of ornamental gateways, to accentuate its already more or less seclusive appearance.

The houses provided for such arrangements may be of almost any size and style, just as for ordinary street-located homes, although they naturally will be governed in this respect by conditions that make for financial success. They are generally small, of one or two stories and containing from three to five rooms, and they usually conform more or less in style, to the end that a somewhat symmetrical appearance may prevail. Yet it is rarely that each is an exact duplicate, either in size or in style, of the others in that particular group, although opposite ones in the two rows are frequently alike except for a reversal of the plan. While the single-family unit is the more common, there are often duplex, or two-family, houses in such court groups. The house facing the courtyard from the rear is, in fact, quite frequently a duplex.

It is apparent that the community court is a most economical plan of building. First of all, it economizes ground space, for the arrangement permits of the building of about six or eight homes on a plot that otherwise would be utilized for two or three. To illustrate, two city lots of usual size—say, from 40 to 60 feet wide and about 120 or 150



THE COMMUNITY COURT PERMITS ECONOMY OF GROUND SPACE WITHOUT CROWDING



THE COMMUNITY COURT OFFERS AN IDEAL GROUPING FOR SMALL HOUSES

feet deep—will prove quite ample for the ordinary scheme of a double row of buildings. Secondly, it enables the erection of a number of houses at the same time, and close together.

The community court idea has generally

proved a highly remunerative building plan for private investors, and until recently at least has been very easy to finance. Surely it should have interesting possibilities also for industrial concerns, and other organized bodies interested in the housing problem.

Making New Jersey the Children's State

Governor Edwards of New Jersey has designated May 8-15, 1921, as Child Welfare Week for the state. An extensive campaign of agitation and education has been prepared which will enlist the coöperation of municipalities, welfare organizations and the general public. Copies of "New Jersey Children" for March-April, 1921, giving the program of operations and practical suggestions for carrying it out may be obtained from the New Jersey Council of Child Welfare, 13 Central Avenue, Newark, N. J. This will be found of prac-

tical value to chambers of commerce, women's clubs and other organizations contemplating child welfare campaigns.

Come, Let Us Build A Happy State

Let us give every New Jersey baby a chance to be born well.

Let us give every child in the State a chance for a strong, healthy body, and happy play days to remember.

As he grows older, let us make New Jersey mean to him opportunity and generous help.



Let us make New Jersey mean "home."

If we do this, we shall not need to worry about Bolshevism, or any other "ism" that destroys.

Let us build the happy, contented New Jersey of tomorrow by the right care for the children of today.

Is Your Community Ready to Do Its Share?

PART OF THE EFFECTIVE COVER PAGE OF "NEW JERSEY CHILDREN"

Garbage and Refuse Collection in Memphis, Tennessee

The Use of Motor Trucks and Trailers Has Expedited Collection Work, Which is Now Handled in a Cleanly Manner

THE city of Memphis, Tenn., has put into operation recently a municipal garbage and refuse collection system which is worthy of record for the study of other municipalities. The system includes the use of trailers drawn by mules in the initial collection work throughout the city. The garbage is collected by two men with a team of mules drawing a trailer through an alley. After the trailer is loaded it is pulled to a central station, and from there the trailers, made up into trains, are hauled by a tractor truck to the incinerator, where they are dumped. The empty trailers are hauled away from the incinerator and delivered to the different districts, where they are picked up by the teams.

A careful survey of operating conditions in Memphis showed that under the old system for the disposal of ashes and garbage 66 mules and carts and three 1- to 2-ton trucks were used. In addition to mule feed and maintenance repairs on carts and har-

ness, investment and renewals, truck fuel and maintenance, there was a daily payroll cost of \$255. The items mentioned brought the cost up to about \$433 per day. This equipment was able to collect 435 cubic yards of refuse at a cost of 99 cents per yard. With the size and growing population of Memphis, it is easily appreciated that the collection of 435 yards of refuse per day did not represent the acme of efficiency.

Under the new system there is but one truck in operation, nine specially constructed refuse trailers, six mule-teams and twelve employes per unit. The new method costs about 65 cents per yard, as against the 99 cents of the former method, making a saving of \$12,600 per year, with the added asset that the garbage is collected more frequently and on a more uniform schedule than in the past.

One of the unique features of this system and its economy is the use of the mule where he is most economical, and the use



TRAILERS ARE DRAWN THROUGH THE ALLEYS BY MULES AND PICKED UP BY TRUCKS AT DESIGNATED POINTS FOR THE LONG HAUL TO THE DISPOSAL PLANT



MAKING UP A TRAIN OF FULL TRAILERS FOR THE LONG HAUL

of the motor truck in its most economical capacity. It has been found by experiment in many cities that it is extravagant to use a motor truck for the collection of garbage where it must stop every few feet, thus causing an undue wear on the engine. A particular incident of this is in the investigation at Worcester, Mass., under the direction of Professor Frederick Bonnet, formerly Professor of Sanitary Engineering at Worcester Polytechnic Institute. It was found in the investigation of Professor Bonnet's committee that a motor truck would be exceedingly uneconomical under

very short haul conditions, namely, where the truck must stop every few feet. Because of this the collection of garbage with horse-drawn vehicles was continued.

In Memphis, an advance step has been taken, in that mules are used where they can make the frequent stops readily, and when the trailers are filled they are delivered at a point where a tractor truck can quickly haul them to the central station, a matter of some distance, a trip which the truck can make more quickly and more economically than could the mules hauling either wagons or trailers.

The time for a Spring Clean-Up is near. Why is a Spring Clean-Up necessary? Because during the winter months people allow their waste material to collect about their premises. How can this necessity be prevented? By an adequate municipal collection of ashes, rubbish and garbage.

If you want a clean city at all times, work for a municipal collection of such material that covers the whole year.

Courtesy of W. Phillip Shatts, Civic Secretary, New Haven (Conn.) Chamber of Commerce

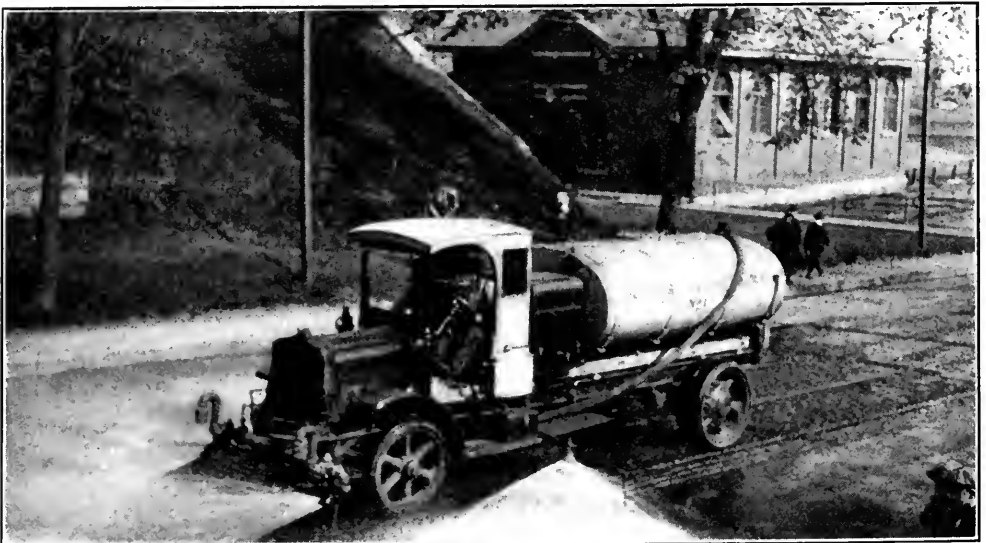
FROM THE MONTHLY BULLETIN OF THE DEPARTMENT OF HEALTH, NEW HAVEN

Motorization Rapidly Increasing in Municipal Departments



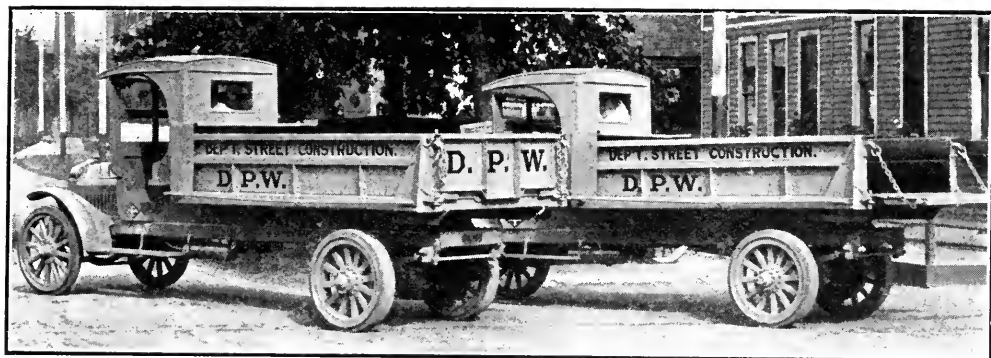
NEW HOSE AND PUMP RECENTLY PURCHASED BY ASSINIBOIA, CANADA

The Northern equipment is mounted on a Cole chassis. Under test, it delivered 600 gallons per minute at 120 pounds pressure, drafting water about 10 feet



WHITE 5-TON "STUDEBAKER MODEL" FLUSHER USED BY CITY OF WESTMOUNT, CANADA

The cost of sprinkling with this outfit was 1.28 cents per 1,000 square feet; cost of flushing where double trip was required, 4.11 cents per 1,000 square feet, and for single trip 1.39 cents. These costs include gasoline, oil repairs, depreciation, insurance and the wages of two men



DIAMOND T TRUCKS EQUIPPED WITH HEIL BODIES FOR DEPARTMENT OF STREET CONSTRUCTION



A TIFFIN FLUSHER USED TO CLEAN THE PAVEMENTS OF TACOMA, WASH.



A SELDEN SCHOOL BUS OPERATING FOR COLOMAKEE SCHOOL, NEAR BLAKELY, EARLY COUNTY, GA.

News and Ideas for Commercial and Civic Organizations

Two A. C. B. Summer Schools This Year

Two Summer Schools of Community Leadership will be conducted by the American City Bureau in 1921. The session for Pacific Coast secretaries will be held at Stanford University, Palo Alto, Calif., August 1-6. The session for the eastern and mid-west secretaries will be held at Madison, Wis., in the halls of the University of Wisconsin, August 15-26.

Consumers Settle Gas Problem

CONNEAUT, OHIO.—When the gas consumers of Conneaut were threatened last August with a discontinuance of the service of natural gas, those consumers, under the leadership of the Chamber of Commerce, settled the question by purchasing the plant of the distributing concern, forming their own company, and raising the rates, and the new company now controls the supply in nearly the entire county.

The gas supply had been slowly decreasing for more than a year, during which time the President of the North Eastern Oil and Gas Company had several times called the attention of the City Council to the scarcity and to the inability of the company to drill more wells if the price to the consumers remained at 34 cents per 1,000 cubic feet. No attention was paid to the communications until a letter finally came stating that the supply was practically exhausted and that the company intended to ask the Ohio Public Utilities Commission for authority to discontinue the service despite the fact that its franchise had six years more to run.

The city had lived through the two previous winters with very little gas. All the industrial establishments had been ordered to discontinue the use of gas for fuel, which made it possible for the households to obtain barely enough for their use.

Shortly after the reorganization of the Conneaut Chamber of Commerce by the American City Bureau last April, question-

naires were sent to the members asking them to designate the fifteen most important subjects requiring attention. A solution of the gas problem led the list on four out of every five questionnaires returned, and the Chamber accordingly at once set out to find the solution.

A committee, with John Cupples as chairman, was appointed to make a study of the entire situation. Mr. Daly, President of the distributing concern, in one of his letters to the city officials, had suggested that either an artificial gas plant be constructed or that the city buy the North Eastern's property. After many weeks of research work, the committee decided to recommend that the consumers purchase the gas plant and reorganize the company.

In the meantime, the distributing company had secured permission to discontinue the service on October 21. A few days before the discontinuance order was to become effective, the consumers were called together in a mass meeting to listen to the committee's report and to its proposition that the consumers purchase the plant, including a plan for the subscribers to charge themselves enough for gas to afford sufficient capital to enable them to develop new fields. The consumers told the committeeman to go ahead, and an extension of time in which to complete the organization of the new company was asked for and granted. An ordinance authorizing the formation of the new company was later passed.

The campaign for the sale of stock in the new company then began, under the leadership of H. A. Gleason, President of the Chamber of Commerce. In view of the fact that the entire county, except the city of Ashtabula, was in the same plight as Conneaut, the proposition met with considerable favor among the gas consumers outside the city, and they gladly joined the movement.

After the stock-selling campaign had been fairly started, the project was placed in

the hands of the gas subscribers' temporary organization, which appointed F. B. Dunn as campaign manager because of his successful conduct of the war work drives in this community. Mr. Dunn employed the usual publicity in selling the stock.

On December 30, the reorganization had been completed. Cash in the amount of \$100,000 was handed to the North Eastern Oil and Gas Company toward the \$245,000 it was asking for the property, and notes were given for the balance. The Board of Directors of the new company elected F. B. Dunn as President, H. A. Gleason as Treasurer, and W. S. Abbott as Secretary.

LE ROY G. MAYER,
Secretary, Conneaut Chamber of Commerce.



AROUND THE SPRING HOUSE

Park Saved for Texarkana in Swift Campaign

TEXARKANA, ARK.-TEX.—After a spirited campaign for parks and playgrounds, conducted by the Texarkana Chamber of Commerce last fall, which produced in all about \$67,000, the Chamber was able to purchase and present to the city Spring Lake Park, which was badly needed for a playground, because, strange though it may seem, there was absolutely no public park in the city to which tired workers could resort for recreation. The Chamber had been given an option on the park at \$40,000, which it was obliged to take up at once in order to prevent the park from passing into private hands and thus being practi-



A GLIMPSE OF THE BRIDGE FROM THE END OF THE LAKE

cally forever out of the reach of the public.

Realizing the necessity for immediate action, the Chamber appointed a committee to conduct a money-raising campaign in order to secure the funds with which to purchase Spring Lake Park and other park and playground sites. The campaign was systematically organized, the method of organization being similar to that used by the American City Bureau in its membership campaigns. First an intensive educational campaign was carried on by means of letters, circulars, newspaper advertisements, stories, motion pictures, and some excellent lectures. The committee secured the assistance of Lester D. Watrous, of the Winfield, Kans., Park Commission, who delivered an inspiring address before a large and interested audience.

The educational campaign was followed by the actual work of raising the money, this being done by teams in charge of captains. Daily luncheon meetings were held at which the teams reported progress, and enthusiasm ran high at those meetings. In three days \$65,000 was subscribed, and subscriptions kept coming in after the campaign was supposed to be closed.



PAVILIONS AND DIVING FLOAT, SPRING LAKE PARK

On Euclid Ave., Cleveland

where millions of pedestrians
pass to and fro, **TROPICAL
SPECIAL STREET MARKING
PAINT** lasts for months

Most street marking paints last for a few days only. No wonder! They're made from gloss oil and whiting—the frailest materials known to paint manufacturers.

Hundreds of cities have found Tropical Special Street Marketing Paint lasts for months. In Cleveland, Ohio, at Euclid and 9th Streets, where hundreds of thousands of pedestrians pass daily, Tropical lasted for four months before it needed repainting.

Tropical Special Street Marking Paint is an excellent quality of oil paint that penetrates the pores of concrete, brick, wood block, asphalt or any other type of pavement. It withstands the gruelling wear of traffic longer than any other paint you can buy. Yet the cost of application is no greater than other paints. It dries within a few hours.

Use "Tropical" for marking safety zones, zoning fire plugs, in front of theatres, public places, municipal parking spaces, etc. Write for complete details and list of cities using Tropical.

THE TROPICAL PAINT & OIL CO., CLEVELAND, O.
"The Firm that Serves with what Preserves"



TROPICAL

Paints—Enamels—Roofing Materials



In this beautiful park, which covers 114 acres, are a deer pen occupying 12 acres, a large lake fed by a natural spring, a free tourists' camping ground, and a mile race-track. The first large event to take place in Spring Lake Park after its purchase for the city was the Texarkana District Fair, which drew attendants from over twenty-five counties in the Texarkana district in the states of Arkansas, Texas, Louisiana and Oklahoma. Band concerts were given in the park on pleasant Sunday afternoons during the summer by the Chamber of Commerce band. Other playgrounds are to be purchased in central locations in the city.

HERMAN FRIEDMAN,

Assistant Secretary, Texarkana Chamber of Commerce.

Bond Issue Insures Reclamation of Large Area

FRANKFORT, KY.—A reclamation project has been undertaken in Frankfort which will release an area nearly as large as Frankfort itself for industrial, residential and recreation purposes. This territory had been rendered useless by the frequency with which the Kentucky River overflowed its banks. By getting behind the enterprise and bringing to a successful conclusion the campaign for an issue of bonds to make possible the installation of a sewerage and drainage system and the construction of a dam, the Chamber of Commerce again proved its worth to the city. The dam, besides preventing the flooding of the land, will form a bridge at a point on the old Leestown Pike which at high-water periods has been so seriously inundated as to make it impossible for the farmers to haul their produce into town. Work is to be started on the project this spring.

Several manufacturing establishments can be accommodated on this reclaimed land. One concern, which will probably employ 500 persons, has already begun the erection of a plant, and expects to build several dozen workingmen's homes.

The holding of "Tag Day" on the day preceding the election assisted in arousing interest in the project. Everybody wore tags on election day also. The workers went out on the streets early and tagged everybody who would allow himself to be tagged. The tags bore on one side the legend, "Frankfort Industrial Expansion, Sewerage and Drainage Canal. No In-

crease in Taxes," and on the other side, "Vote Yes, Nov. 2nd."

Large blue-print maps of the city, showing the area to be served by the improvements contemplated, were distributed among the stores and other places of business. These were very helpful in creating enthusiasm. One such map was tacked up in the office of the Chamber of Commerce. It was used freely during the week before the election at the group meetings of the members conducted every afternoon at 2.30, at which the advantages of the project were explained in detail. Many questions were asked and answered, and it was possible in this way to reach a great many of the members and dispel fears and doubts.

The campaign was well organized, with a director, divisions, and captains. The newspapers and the motion-picture theaters coöperated fully, as did also the trolley companies. The Chamber issued a booklet on the subject. Hundreds of these were distributed by the agents of the local branch office of the Metropolitan Life Insurance Company, the manager of which instructed his men to take them around from house to house, stopping long enough to explain the proposition and answer questions. On "Tag Day" these insurance agents also assisted in decorating the populace with tags.

The Chamber had the hearty coöperation in all this work of the Mayor, who gave generously of his time, influence and counsel.

L. S. JOHNSON,

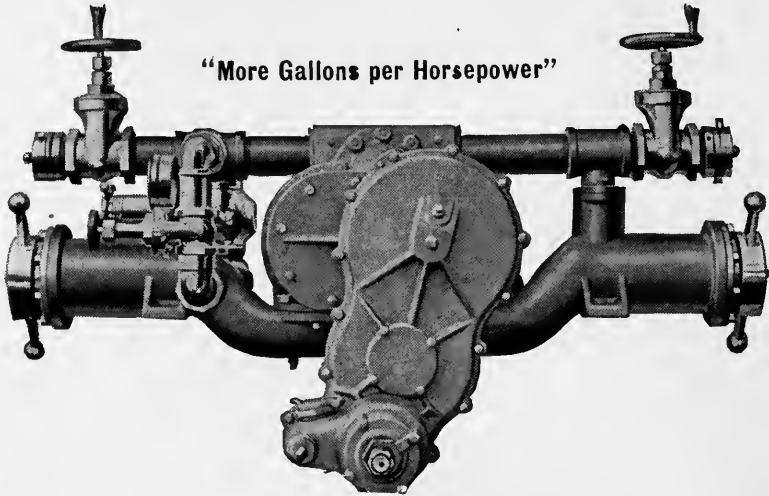
Secretary-Manager, Frankfort Chamber of Commerce.

Sioux City's Interesting Trade Tours

SIoux CITY, IOWA.—Nearly 100 of the liveliest business men in Sioux City visited their customers in 57 towns in northern Nebraska and South Dakota late last fall in a trade tour known as the "Cornhusker-Rosebud Special," which occupied four days. The train was made up of three Pullmans, a dining, a tourist and a baggage car, a day coach and an observation car. Reed's Military Band accompanied the party, and there were a number of special attendants.

The sole purpose of the trip was to spread good fellowship among all those people. While the business men were calling on the trade, the band gave concerts on the streets. The visitors received such a cordial reception everywhere as to make them wish they

The Northern Rotary Pump



In Fire Service—or In Water Works *The Same Unexcelled Service*

THE long records of unusual service in fire service have spread the reputation of the Northern Rotary Pump everywhere among fire apparatus users.

In water works systems the Northern Rotary Pump will give that same meritorious service. It will pump more gallons per minute per horsepower than any other pump manufactured.

*Write for Complete
Descriptive Catalogue*

NORTHERN FIRE APPARATUS CO.
2420 University Ave., S. E. :: MINNEAPOLIS, MINN.

could prolong the visit. At Long Pine, Nebr., the train was greeted by a party of school children led by their superintendent, who gave an address of welcome. The visitors were afterwards taken on an automobile trip to a large canyon about which a beautiful park had been developed. Each city that was visited endeavored to show the guests the beauties of the country surrounding the town, and succeeded so well that the party became very enthusiastic about the entire region.

The baggage car carried 1,000 pounds of candy. At several points the candy attendant, a large, jovial colored man, was sent through the city in a motor car filled with candy which he threw out to the children

Butte, Nebr., was not scheduled for a visit because it was not on a railroad line, but the Butte Community Club would not be neglected. Representatives of the club met the train at Anoka and drove the party to Butte and back, showing what the town had to offer despite the fact that it had no railroad. At Burke, S. Dak., a special edition of the *Daily Dam Site* was issued as a welcome to the visitors and urged them to support the movement to place a dam across the Missouri River at Mulehead nearby. At Chadron, Nebr., the Boy Scout band and a large delegation of citizens escorted the party up-town, where its band and the Sioux City band gave a joint open-air concert.

Perhaps one of the most pleasing incidents



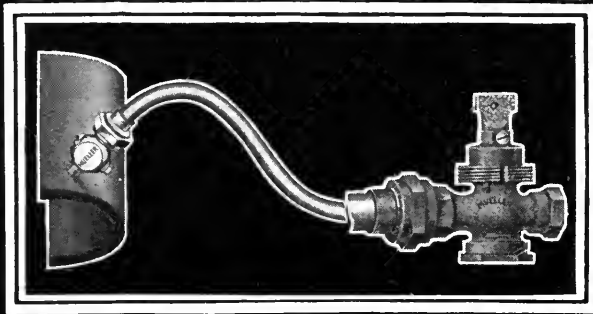
SIoux CITY PARTY AND SPECIAL TRAIN, AT LONG PINE, NEBR.

who were lined up along the streets. The baggage car was also well stocked with cookies, soft drinks, cigars, and novelties of various kinds which the individual concerns furnished their representatives.

Every courtesy was shown the visitors by the commercial organizations in the several towns. At Crawford, Nebr., the party was scheduled to arrive after the usual closing hours of the stores, but at the request of the local Commercial Club, the stores remained open until the train had departed. At Winner, S. Dak., the Chamber of Commerce met the "special" and escorted the party around town in automobiles. In the evening a smoker and entertainment was given by the business men, after which there were refreshments, served by the ladies, and a dance.

of the trip was the presentation to the party of a fine pig as a souvenir of Herrick, S. Dak., where a stop was made. The "porker" was at once dispatched to Sioux City with the understanding that it would be the principal viand at a dinner for the party upon its return. That dinner took place one week later in the dining-room of the Sioux City Chamber of Commerce, and was followed by one of the finest meetings of the year. The entire trip was lived over between helpings of the Herrick prize pig.

The "Cornhusker-Rosebud Special" proved to be an all-around success. It was preceded a few weeks before by an automobile trip called the "Sioux City Fellowship Caravan," which was extremely successful. Giving a special title to each trip not only helps to advertise it, but makes the memory



MUELLER Lead Flange Goose Necks and Curb Cocks

These two **MUELLER** items (E-500 and E-557) are standard in lead flange connections for service work, and embody the well known **MUELLER** standard of quality, which invariably insures dependable service at minimum upkeep.

MUELLER LEAD FLANGING MACHINE

This hand-operated, direct drive **MUELLER** Machine (E-177) is so perfect in mechanical detail that with it anyone can make lead flange connections easily, quickly, and economically—either at the bench or the machine can be attached to a board for portable work—and can be used in either a vertical or horizontal position. Write for description and prices.

H. MUELLER MFG. CO., Phone Bell 153, DECATUR, ILL.

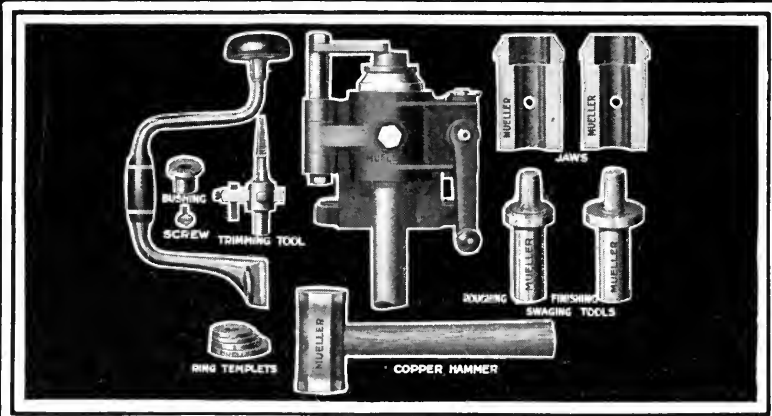
Water, Plumbing and Gas Brass Goods and Tools

New York City, 145 W. 30th St.
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San Francisco, 635 Mission St.
Phone Sutter 3577

Mueller Metals Co., Port Huron, Mich., Makers of Red Tip Brass and Copper Rod and Tubing; also Forgings and Castings in Brass, Bronze and Aluminum



of it remain longer in the minds of the people in the towns visited.

WILLIAM HOLDEN,

General Secretary, Sioux City Chamber of Commerce.

Profitable Two-Day Merchandising Conference

ONEONTA, N. Y.—Merchandising, better buying and selling methods, and scientific store management, were emphasized in a comprehensive two-day program at the Otsego County Merchants' Conference held at Oneonta January 13-14. This was conducted by the Oneonta Chamber of Commerce in coöperation with the Otsego County Improvement Association and similar organizations of the city and county. More than 140 merchants, almost equally divided between the city and the surrounding towns, and 30 members of the Farm Bureau and the Home Bureau, who were invited as guests, were in attendance at the various sessions.

A better understanding of the merchant's problems by the consumers, and a glimpse by the merchant into the consumer's point of view, were furnished at the luncheon, afternoon and dinner sessions held the first day. A motion-picture lecture provided by the National Cash Register Company featured the evening session. Frank Stockdale, of Chicago, an expert on retailing, was the chief speaker at three sessions on the second day. Mr. Stockdale laid particular stress on the individual problems of the merchants—on the value of prosperous retail business to the community, and on the pressing demand for modern methods and organized management in the store.

Steps were taken at the closing session to continue the educational work among the merchants of the county through the appointment of a committee representing the Chambers of Commerce of Oneonta and Cooperstown, the County Improvement Association, the Farm Bureau and the Home Bureau.

The program for the conference was arranged in conjunction with the extension department of the New York State College of Agriculture, which conducted a similar conference with practically the same speakers at Ithaca, N. Y., earlier in the same week. The State College also sent several speakers to participate in the first day's program at Oneonta.

The expenses were met by a small assessment on the merchants attending, over the cost of each meal partaken of by them. A deficit of only \$10 accrued, and this was covered by a contribution. The overhead expenses were met by the two organizations in charge.

A number of new ideas were instilled into the minds of the merchants participating, and the follow-up work aided in putting new methods of merchandising into effect which have resulted in a larger volume of business and greater profits for the merchants of the county, and better service at lower cost to the consumers.

EVERETT HICKS,

Secretary, Oneonta Chamber of Commerce,



Business Men Reward High School Football Team

NEWPORT, R. I.—Recognition of the work of a successful school athletic team was the unusual feature of a dinner given a few weeks ago by the Retail Merchants' Forum of the Newport Chamber of Commerce. A sterling silver trophy (illustrated above) was presented to the Rogers High School football team by the Chamber of Commerce as a tribute to the unbroken list of victories during the season that was just closing by which the team had won the state championship.

The Secretary of the Chamber of Com-

THE AMERICAN CITY

Just as the Advertisement Said



Ask the....., Fire Chief....., Fire Protection Expert....., Business Man

Leave it to them!

Ask any authority these questions:

- In old school buildings is there danger of fire?
- In old school buildings are automatic sprinklers the surest safeguard?
- Do they fight fire automatically?
- Does the heat of the fire start them?
- Are they always on guard?
- Are they the best protection for my child?

Or ask any business man in your town who has a sprinkler system.

Convince yourself by asking. But don't wait until your school burns and children pay with their lives for someone's negligence. Ask any authority.

Ask now. Today!

Let us send you our remarkable booklet, "Fire Tragedies and Their Remedy." Write us now before you put aside this magazine. Address: Grinnell Company, Inc., West Exchange Street, Providence, R. I.

GRINNELL COMPANY

EXCLUSIVE OFFICE

PROVIDENCE, R. I.

Complete Engineering and Construction Service on Automatic Sprinklers, Industrial Piping, Heating and Power Equipment, Fittings, Pipe Valves.

GRINNELL AUTOMATIC SPRINKLER SYSTEM—When the fire starts, the water starts

Reproduction of an advertisement published last year in national magazines

The answer was—Automatic Sprinklers!

THESE newspaper clippings could be multiplied many times. They show that Fire Chiefs of cities, Fire Marshals of many states, and other experts have been asked the question:

"Do schoolhouses burn more, colleges more, hospitals more, than other buildings?"

In public meetings these authorities say the conditions could hardly be more frightening with 47 school fires a week, 2 college fires a week, 4 hospital fires a week.

"What about our schools, our colleges, our hospitals—are they dangerous?"

In public meetings these authorities reply, after investigations, that most school buildings are dangerous.

Such was the reply given by authorities to the citizens of Brooklyn, Baltimore, Wilmington, Philadelphia, Waterbury and Rochester in the East; Minneapolis, Seattle, Los Angeles in the West.

Any city, large or small, that has not been told the same thing has not yet asked experts to investigate and report.

A few copies of "Fire Tragedies and Their Remedy" will start your city to asking questions. Don't wait until a burning schoolhouse has caught its little victims or a hospital has trapped helpless invalids—send for a copy today. Address Grinnell Company, Inc., 283 West Exchange St., Providence, R. I. Send also to the National Fire Protection Association, Boston, for its books on Schools and Hospitals (ten cents each).

GRINNELL

AUTOMATIC SPRINKLER SYSTEMS

When the fire starts—the water starts.

Needless Destruction by Fire

PUBLIC attention should be attracted by the remarks of Mr. T. Alfred Fleming before the convention of fire marshals in New York City last week. In his outline of details is familiar, but his recital of the enormous waste and loss in the United States from preventable fires, and also the importance of a continuous campaign of education designed to reduce these losses.

Generally speaking, there is nothing new in Mr. Fleming's statement as to the magnitude of the fire losses, but relatively few persons realize that in 1914...

\$100,000 FOR FIRE SAFETY IN SCHOOLS

First Step in Protection Program Will Be Taken With Placement of Apparatus This Week.

FIRE PROTECTION FOR SCHOOLS

Winter approaches and soon it will be time to start the fires in the school buildings. Are those buildings, every one of them, equipped with fire escapes which are ample and readily accessible? Are parts of the buildings combustible? Are they most exposed to fire? Are they most exposed to fire? Are they most exposed to fire? Are they most exposed to fire?

It may be permissible under the laws of circumstance to crowd children into schoolrooms and to hold sessions in temporary quarters, but nothing can excuse carelessness in fire prevention and inefficiency in fire fighting.

ELIMINATION OF FIRE HAZARDS IS CITY'S PLAN

All public buildings in the downtown section of Seattle are to be inspected for the elimination of fire hazards. First one or two buildings will be selected from the list and will be made safe.

COUNTY HOME FIRE TRAP, SAYS STATE BOARD

Hospital Has Inadequate Water Pressure, Is Report.

ALSO OVERCROWDED
Fire Escape of Easy Descent Not Provided

SCHOOL FIRE ESCAPE IS BUILT OF WOOD

No. 38, Where Blaze Broke Out Friday, One Of Buildings Criticized In Survey.

TWO CLASSES NOW USING EXIT

All Three Stairways In Building Constructed Of Frame—No Fails Seen On Doors—Wooden Parallels Filed Near Entrance.

Public School No. 38, Fifth and Carroll avenues, where fire on Friday caused 225 children to march from the building without wraps or hats, evidently is one of the 50 buildings in the downtown section of Seattle.

merce told the 200 diners of the experiences of the team the previous year, when the boys of the school, on their own initiative, organized a good team, which, in spite of injuries to some of the players, won 212 points to their opponents' 52, scoring eight victories, one tie, and two defeats. During 1920 the team paid off a considerable debt, won the support of the school and the city, ended the season without a defeat, scoring 290 to their opponents' 27 points, and winning the state championship.

The meeting was alive with good will, enthusiasm and cordiality. Other speakers gave talks on business principles, and related their talks to the spirit of the evening by showing how team work and self-control affect business success.

The hall was appropriately decorated with American flags and flowers. An orchestra played during the dinner and between the speeches, and all joined heartily in singing well-known songs under the leadership of C. LeRoy Grinnell. The school cheers were given with a will by the football team whenever the occasion presented itself.

W. C. CAMPBELL,

Managing-Secretary, Newport Chamber of Commerce.

Untangling a Trolley Snarl

FALL RIVER, MASS.—Coöperating with the trolley company instead of fighting it was the method used in Fall River to work out the solution of a complicated traction problem. In July, 1919, the Eastern Massachusetts Street Railway Company's finances, as far as its operations in Fall River were concerned, had become exhausted. Costs were mounting, the service was deteriorating, the fare had been raised to ten cents, the public was walking as much as it could, and the sentiment generally was unfavorable to the trolley company.

Convinced that the Fall River lines could be made to pay their way, the Chamber of Commerce took the lead in a movement to have the local system divorced from the old Bay State Company. A petition to the Public Trustees of the Eastern Massachusetts Street Railway Company from the Mayor, the Merchants' Association, the Cotton Manufacturers' Association, the Chamber of Commerce, and the four daily newspapers resulted in the separation.

The petitioners next secured the introduction of a \$3 commutation ticket, good for

50 rides in a calendar month. To make this modified six-cent fare a success, the number of riders had to be increased. This the Chamber of Commerce, in coöperation with the other petitioners, undertook to bring about. Tickets were placed on sale at a number of convenient points about the city—in stores, mills and offices. This community effort to sell street railway transportation was successful, for the number of riders increased nearly 100,000 during the first month after the new plan had been put in operation. In July, 1920, 1,400,000 passengers were carried, compared with 800,000 in July of 1919. In April of 1920, a shoppers' ticket, giving 16 rides for \$1, without transfer, was introduced, and this still further increased the number of passengers carried.

The company meanwhile was enabled to carry out its part of the agreement, and practically doubled the number of its cars. The line has shown a profit for every month since the introduction of the commutation ticket, except during the blizzard period of the winter of 1919-'20, and during the low point of the industrial depression in December, 1920.

The rehabilitation of the company made it possible for it to bear its share of the expense of carrying out a long delayed program of municipal street paving, with the resulting improvement in the condition of Fall River's streets.

Soon after the separation of the Fall River lines, the Public Trustees of the street railway company asked the Chamber of Commerce to help in the selection of a group of representative citizens to constitute a Home Rule Commission to administer the local system and represent the riding public. Such a commission was appointed by Mayor James H. Kay, at the request of the Chamber, and is composed of a labor leader, who is chairman, two directors of the Chamber, a mill treasurer, the city solicitor, and an alderman.

There is no doubt whatever that the home rule plan, after more than a year's trial, supported as it has been by the community, has proved advantageous both to the company and the public. Fall River is convinced that it pays to work with, instead of against, a public utility.

CHARLES M. KETCHAM,

Manager, Fall River Chamber of Commerce.

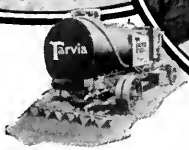
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Or like this?

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New York. "Tarvia-X",
Penetration, 1916



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\$300,000,000 yearly in marketing
crops, because of roads like this



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Johannesburg	Lebanon	Youngstown	Toledo		Columbus	Richmond	Lafayette	Bethlehem
Elizabeth	Buffalo	Baltimore	Omaha		Jacksonville	Houston	Denver	
THE BARRETT COMPANY, Limited.				Winnipeg	Vancouver	St. John, N. B.	Halifax, N. S.	

Bus Line Plans Abandoned as Result of Survey

LEXINGTON, KY.—A survey of Lexington's transportation needs was made recently by the Lexington Board of Commerce. The object was to determine the practicability of introducing a motor bus system to reach sections of the city not served by street railway lines. Four bus routes, beginning and terminating in the heart of the business district, had been mapped out and experts brought in to figure the cost of installing and operating the lines. An effort was made to work out a system wherein none of the bus routes would parallel the street railway lines, as it was not the desire of the Board of Commerce to impair the usefulness or reduce the revenue of the existing transportation company.

The survey proved that the local problem would be aggravated rather than helped by the operation of competitive lines, as it was impossible to avoid paralleling the street car lines; also, taking into consideration the number of automobiles owned by residents in the outlying sections of the city, it was not deemed either profitable or desirable for the proposed motor bus lines and the railway company to compete for the business.

Lexington is not primarily an industrial city, where the question of transporting factory employees would have to be considered, and this fact, added to the knowledge of the large number of automobiles owned by the prosperous citizens of Lexington, aided the Board of Commerce in arriving at a decision to disapprove the proposed installation of the motor bus system.

C. F. DUNN,
Secretary-Manager, Lexington Board of Commerce.

Red Lake Falls Provides for Guests

RED LAKE FALLS, MINN.—A concrete example of what a national highway can do toward improving a city is shown by the erection of the New Lincoln Hotel at Red Lake Falls, the county-seat of Red Lake County. About three years ago tourists on a New Orleans-to-Winnipeg sociability run along the Jefferson Highway "passed up" Red Lake Falls on account of its poor hotel accommodations, and went instead to Thief River Falls, 18 miles further north. Red Lake Falls had 2,000 people but sorely lacked hotels.

The progressive business men of Red Lake Falls decided that it was useless to wait for private initiative to build the hotel so much needed, and therefore, under the leadership of Sam E. Hunt, then President of the Red Lake Falls Commercial Club, a stock company capitalized for \$50,000 was organized and the New Lincoln was built.

The hotel has 26 guest-rooms, 8 of which are with private bath, and every room is equipped with hot and cold running water and a telephone. There is a tiled lobby, a



HOTEL LINCOLN, AT RED LAKE FALLS, MINN., MADE NECESSARY BY THE PROXIMITY OF JEFFERSON HIGHWAY

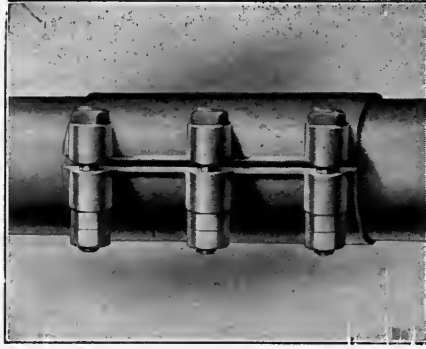
dining-room and a café, also a kitchen equipped with the latest electrical and mechanical devices. Travelers state that it is the most modern hotel in northern Minnesota, and it is filled to capacity most of the time, especially during the season for tourist travel.

Although the building cost \$45,000, it could not be duplicated for \$65,000 to-day. The principal regret that its owners express is that it was not made larger in order to accommodate the rapidly increasing traffic. Red Lake Falls business men are alive to the fact that in order to secure the tourist business, suitable accommodations must be provided, and the erection of this hotel is the beginning of a movement to make the town an attractive stopping-off place.

The city has done its share in providing a free camping spot in beautiful Memorial Park along the banks of the Clearwater River, and during the summer tents are pitched nightly on these grounds.

W. H. FISHER,
Secretary, Commercial Club of Red Lake Falls.

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Highway Finance

By Horace C. Sylvester, Jr.

Vice-President, The National City Company, New York

HIGHWAY improvements are necessary, even if their permanence cannot be immediately established, and money must be raised to build such highways as are immediately required, although it may be necessary to rebuild them within a few years. Until permanence in highway construction has been attained, the financing of the work should be effected with due recognition of the possibility that reconstruction may soon be necessary.

The first principle which I would emphasize is that in financing highway construction, money borrowed should be repaid as soon as the principal and interest can be raised by taxation without unreasonably burdening or oppressing the taxpayer. Under present conditions, it is impossible to forecast the time when reconstruction and rebuilding will be required. Before that time arrives, the bonds or obligations issued to finance the original construction should have been retired.

It is frequently urged that bonds for public improvements should not run beyond the probable life of the improvement. In my opinion, this idea has only a limited application to the financing of highway improvements. Highway bonds should not run during the probable life of the improvement, if the municipality, county or district can sooner retire them. If it retires them at the earliest possible date, it clears the field for the reconstruction which under present conditions appears to be inevitable.

On the other hand, if the improvement is of such pressing necessity that the locality cannot prosper without it, the fact that the term of the bonds will exceed the probable life of the improvement, should not prevent construction if the securities can

be retired within a reasonable term. It is my opinion that no highway bond should run longer than thirty years. If the locality cannot pay sufficient taxes to retire a highway debt within thirty years, there is grave question whether the highway should be undertaken. Any improvement may cost more than the municipality ought to pay, and that point in my judgment is usually reached in the case of highway construction when a county, township or district cannot pay the debt within the term of thirty years. Minds may differ as to the maximum term. Some might say that forty years is not too long. Whatever the maximum term be, every one will agree that some limit should be placed upon the life of the debt.

The State in Highway Financing

The other features in the proper and successful financing of highway construction are those which create an attractive and marketable security and permit the borrowing of money on the cheapest and lowest terms. The price paid for money is the interest, or interest and discount if bonds are sold below par. The successful security is that which can be issued at or close to par at a low rate of interest. The method of financing should be directed to the issuing of such a security.

The first consideration is that the larger and wealthier the obligant in the bond, the better the price which will be received. If highway construction can be financed by state bonds, the money will be borrowed at a lower rate than if it is financed by county, township or district bonds. Road builders now recognize that it is the function of the state to provide a state-wide system of highways. For the construction of these,



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state bonds are usually issued, and bear a lower rate of interest than any other form of highway obligation.

County Bonds Attractive to Investors

The next unit in road construction in order of importance, is the county. County bonds approach state bonds in security and desirability, and are a much better security and much more attractive to investors than the bonds of a township or district.

Finally come the bonds of the township or district. These are good securities, but the rate of interest is higher than the rate on bonds which may be issued by either the county or the state.

To successfully finance highway construction, it is my opinion that highway bonds should be issued by a state, by a county, or by a district or township, and should be paid from an ad valorem tax which is authorized to be levied in an amount sufficient to pay the bonds. No limit should be placed upon the rate of tax which may be levied. If such a limit be imposed, the desirability of the security will be affected, the rate of interest will be increased, and the taxpayers will be needlessly burdened.

Community Credit a Valuable Asset

The day has gone when the citizens of any community will borrow money for a public improvement and stand by and condone a default in repayment. The public is slowly but steadily recognizing that the credit of the community is a valuable asset; that it means modern improvements, and the many facilities and advantages which are now furnished through the agency of municipalities and political subdivisions and which are so essential to modern life. If the municipality or other political subdivision defaults in its obligations, its credit is destroyed; it can no longer raise the money with which to furnish the citizens with modern advantages, and its residents soon find that they dwell in a locality upon which a blight has fallen.

In addition, there is the inherent principle of honesty in the repayment of a debt, and to the credit of American communities, it may be said that few or none take money from a lender and refuse repayment. Hence, no matter what tax may be provided for the payment of the bonds, whether it be limited or unlimited, the community intends and

expects to repay, and the imposition of a tax limit for the purpose of repaying the debt merely causes the municipality or political subdivision to pay a higher price for the money it borrows. Self-interest thus demands that the state and its subdivisions should place behind the bonds an unlimited power to raise sufficient taxes to pay principal and interest.

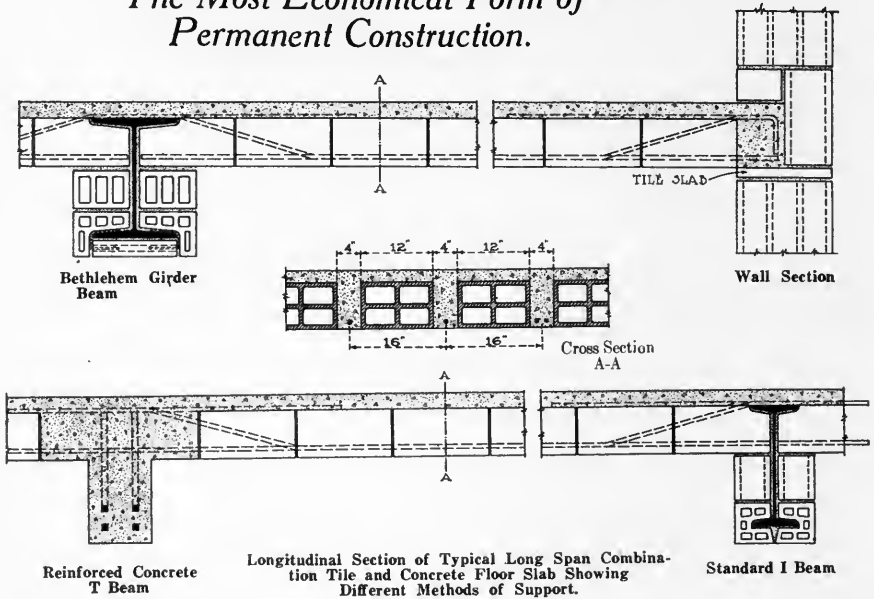
How Investors View "Special Assessments"

The same principles apply to all special forms of highway securities, such as those authorized by the Donahue Act of Washington or the Covert Act of Michigan. Each of these statutes embodies the idea of a special assessment. While a security based upon a special assessment may be marketable, the price paid in the shape of interest and discount will be much greater than in the case of an obligation secured by an ad valorem tax. This will be the case where the bond is issued by a county but is payable from a special assessment, and it is only when a default has taken place in the collection of a special assessment, that the county can be compelled to pay principal or interest. Such an obligation is not regarded with favor. A bond of this kind is usually issued because of some constitutional requirement, or because of the financial condition of the county, in relation to the limitations upon its power to contract debt. Investors do not regard it with the same favor as a direct promise by the county to pay from a tax to be collected by it.

Usually, too, no substantial reason exists for the issuance of a bond payable from an assessment, and upon which the county is liable only in the event of a default in the assessment. The county seeks to sell such a bond as its general obligation and looks for the same price that it will receive for a court-house bond running for the same term and bearing the same rate of interest for which no other means of payment exists than a straight levy of taxes. If the county wishes to obtain the best terms possible, it should, when so authorized, issue its own obligations and promise to levy a sufficient tax to pay them. If the improvement is a proper case for a special assessment against abutting property, or even against the township or district, such special assessment should be treated simply as a means of reimbursing the county, with which the bor-

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rower will have no direct concern. The special assessment should be regarded simply as in the nature of an additional means of raising money or more equitably distributing the public burden and should not have any relation to the bond or debt, except such as arises from the fact that the county has an additional resource.

The county differs only from the city in that it is rural whilst the city is urban. It may, if authorized by statute, collect special assessments for road improvements, just as a city may levy and collect special assessments for street improvements. The best street improvement bond is one which the city promises absolutely to pay from a levy of taxes, although it may also have power of making a special assessment to reimburse it for the cost of the improvement. Many city paving bonds are so issued, and there is no reason why the county should not adopt the same method of issuing its road securities that the city does in issuing its paving bonds.

Refunding Issues Expensive

Simultaneously with the issuing of bonds, the authorities should decide in what method the debt will be paid. In former years, the general method was by issuing a bond having a flat term of, say, twenty, thirty or forty years, and providing for the raising of a sinking fund for the payment of the principal. The obligation to create a sinking fund was not usually observed, and when the bonds matured, it was frequently, if not generally, found necessary to issue a refunding obligation. The same situation might exist when the refunding bonds matured and a second refunding was found necessary. Three refundings, each for twenty years, of an original issue of bonds which ran for a term of twenty years, have been known to happen. The bonds so issued in effect ran eighty years, and although it was the duty of the municipality to annually raise money by taxation to create a sinking fund, at three maturities no sinking fund existed. The interest rate has fallen during the past sixty or more years covering the life of the original bonds, and the first two refundings of this particular issue. It is probable that an average rate exceeding 5 per cent per annum has been paid on these bonds. More than 300 per cent of the original loan has already been paid by way of interest, and

by the time the present refunding reaches maturity, the amount of this interest will be 400 per cent of the original loan. This is not sound financing.

Serial Bonds Replacing the Flat Term

To provide against such a situation, what are known as "serial" bonds are now more generally issued than flat term bonds. In a straight serial issue, a fractional part of the bonds matures in each year, commencing one year after the date of the bonds. The amount of principal payable in each year is the same. The result is that if the loan be for \$100,000 at 5 per cent, running over a term of 20 years, the first year's payment for the instalment of principal and the interest on the whole loan will be \$10,000; the last year's payment, being the instalment maturing that year, with interest on that instalment, being the balance of the loan which is outstanding, will amount to \$5,250. During the life of this loan it is probable that the wealth and resources of the territory will increase and the tax burden for the payment of the principal and interest would be much easier borne during the last years of the loan than during the first. Such considerations suggest that some other scheme of maturities is desirable.

The ideal method is probably to so arrange the maturities that a similar amount will be payable in each year during the life of the loan for principal and interest, but it is not always expedient to break up the number of bonds maturing each year into uneven amounts, as the market is to some extent affected thereby. Consequently, the best course would seem to be to require a serial bond to be issued, but to permit the governing authorities some discretion as to the amount which shall mature in each year, as by providing that the loan shall be payable in annual instalments, commencing one year after date, but that no instalment shall be more than three or four times the amount of any other instalment.

Arranging of Maturity Dates

Sometimes the first maturity is postponed. A postponement of the first maturity for a period not exceeding two years is reasonable, because it sometimes happens that no tax can be levied in time for the payment of the principal of a bond maturing one year after date. For instance, the taxes for the year 1920 might just have

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been levied at the time when the bonds were issued, but might not be payable until sixty or ninety days thereafter. If the bonds were payable one year after date of issue, the first instalment would be payable before the 1921 levy, with the result that no provision would have been made to raise by taxation the amount payable one year after the date of the bonds. For this reason, it is probably better that the instalments should begin to mature not later than two years after the date of the bonds, and the date of maturity should be so fixed in relation to the collection of taxes as to permit the payment of the principal at the earliest date thereafter for the purpose of saving interest to the county, district or township during the time which will elapse in each year between the collection of taxes and the date when an instalment of principal becomes payable.

Sometimes the first maturities are postponed beyond two years, but I have pointed out that permanence in highway construction has not yet been reached, and it is my opinion that highway bonds should begin to mature and should be paid off as quickly as possible, and that the first instalment should not be postponed longer than is necessary to permit the proper financing of the project.

Advantages of Serial Maturities

The advantages of a serial issue as compared with a flat term issue are numerous. The serial issue immediately absorbs the monies raised by taxation to pay the principal. The creation of a sinking fund is rendered unnecessary. The accumulation of large sums in the city treasury in the name of a sinking fund, possibly bearing a small rate of interest, whilst full interest is payable on the city's debt, is avoided. The serial issue automatically conforms to the principles of economic financing, and even if compared to cases when the sinking fund is efficiently administered, results in a saving to the municipality.

The serial method by dispensing with a sinking fund avoids the danger of loss from improvident or negligent management of sinking fund monies, or from dishonesty or incompetency. It removes the temptation to so employ large sums of money as to further personal rather than public aims, and if consistently carried out, it avoids incurring the expenses for the management

of a sinking fund.

But a further and much greater advantage rests in the fact that if a serial issue be made, the danger of a refunding at maturity will be avoided. In the state of California the serial method has been in use for upwards of thirty years, and in my experience I have never handled an issue of refunding bonds of any city, county or school district in California. A well known bond attorney, who examines many California issues, has told me that he has never had an issue of refunding bonds of any city, county or school district in California submitted to him for examination. These facts demonstrate the effectiveness of the serial plan when consistently adhered to.

Proper State Laws Imperative

I have discussed the best method of financing highway improvements from the ideal standpoint, and have assumed that the legislature has dealt generously and liberally with counties, districts and townships. If the necessary powers to issue bonds, such as I have described, do not exist, they should be asked for, and I believe that the legislature will not hesitate to grant them, if it can be done within the limits of constitutional restrictions.

Constitutional restrictions sometimes compel resort to other methods. For instance, if there be a constitutional limit of indebtedness, and the counties, townships or districts in a state have become generally indebted to an amount approximating the constitutional limit, resort must of necessity be had to an unusual and less desirable type of security to finance highway improvement. Resort must be had to special assessments for benefits payable in annual instalments, extending over a term of years, and to the issuance of bonds which are payable only from such special assessments. The courts have held that when a special fund for the payment of a bond is so created, and the obligation of the county, township or district is limited to the collection of the assessment and its application in payment of the obligation, and there is no recourse over and against the general property or funds of the obligant, no debt is created within the meaning of the constitutional prohibition.

But these obligations are not acceptable in the market. They can be placed only if they bear a high rate of interest, and many times they must be sold at a discount. Fre-

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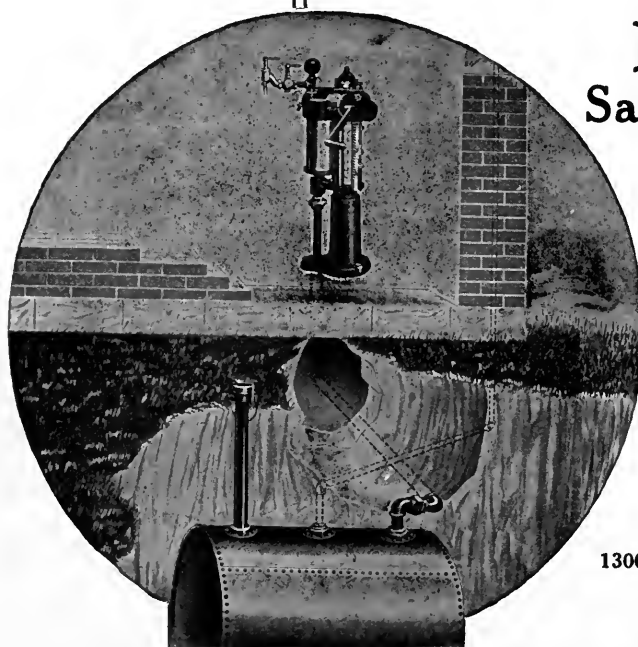
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quently they are issued directly to contractors who have bid for the work knowing that they must take payment in this form. The cost of the improvement is increased, because the contractor so bidding will add enough to absorb any discount at which he will be obliged to sell the bonds. The price of money necessary to finance an improvement when raised in this way will be great. When money may be borrowed upon a general obligation of a county at, say, 5 per cent per annum, it will be found necessary to pay 6 per cent upon a special assessment obligation, at the least. Sometimes the special assessment obligations will be disposed of to the ultimate investor so as to net him 7, 8 or 9 per cent per annum. The public must pay this return to the investor in some form or another.

Keep the Buyer of Securities in Mind

In financing your road improvements, I urge upon you always to try to issue a security which will be attractive to the investor. It is good business for the county, township or district. It is also good business for the banker. The certainty of payment on the due date of an obligation is of the essence of all successful business, and everything that can be done to assure the investor that on the day stated the amount of his loan will be repaid to him, will tend to reduce the cost of the loan to the borrower.

When the type of security and all the particulars as to rate of interest, date of maturity, etc., have been fixed, the bonds should be offered to the public under conditions which will assure the quickest possible delivery. It is usual to require the examination of a municipal or county ob-

ligation by a recognized bond attorney before it is accepted by the purchaser. The best practice is to have this step taken and the opinion secured before the bonds are offered for sale. If that be done, then substantially immediate delivery is assured, and the risk or probability of fluctuations in the market is reduced to a minimum.

Negotiating the Sale

The sale should be conducted under such terms as will assure a fair deal. If a public sale be had, the bids should be received and opened, and the bonds promptly awarded under conditions which will exclude the possibility of favoritism. If the bonds be sold privately, the negotiations should be so conducted that when the purchaser takes delivery of the bonds, he will not find that the county, township or district has already offered them indiscriminately to all the banking houses and generally shopped around trying to obtain a purchaser. No person likes shop-worn goods, and bonds which have been privately offered to every banker or investment dealer by some person professing to act on behalf of the county, township or district, are not looked upon with favor by reputable dealers.

In everything that is done, the best policy is to place the interests of the county, township or district first. Reputable bankers and dealers wish a security which is beyond suspicion and prefer dealing that is open and aboveboard, and so long as they are squarely treated in the sale of bonds, no reputable banker or dealer will complain merely because the interests of the public are carefully protected.

ACKNOWLEDGMENT.—From a paper read before the American Road Builders' Association, Chicago, 1921.

Would It Interest You to Know That—

Colonel C. Seymour Bullock, Director of the Municipal Recreation Committee of South Bend, Ind., wishes to receive information from other cities as to whether one- or two-story buildings are preferable for shelter houses in good-sized parks.

The city of Ottawa, Kans., is just completing a public auditorium, constructed as a war memorial. The building cost \$110,000, and contains an auditorium capable of seating 1,700 persons, with a large stage

accommodating standard scenery. The basement is fitted with a banquet room, kitchen, toilets, and boiler room. There is also an assembly room for the local post of the American Legion.

The water-works system of Providence reports a very successful year financially. After deducting interest charges and \$144,000 for depreciation, the net profit was \$285,000, which has been applied to the sinking funds.

DES MOINES

and Nature's Law



For fire protection, or for domestic supply, why depend upon a cold oil engine or uncertain electrical apparatus and pump?

Gravity, nature's law, never fails. With thousands of gallons of water elevated to such a height as to give a pressure of from 40 to 80 pounds, and ready to pour forth at the turn of a valve or a spigot, you are always prepared for any emergency.

We shall be pleased to send a representative to confer with you.

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DALLAS	1234 Praetorian Bldg.

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234 Inshes Ave., Chatham, Ont.**



Railroad Motor Safety

Fewer Accidents on Long Island Crossings—Increase Throughout Country

GOOD results have followed the safety campaign initiated a few years ago by the Long Island Railroad, to prevent reckless motorists from killing or injuring themselves by driving heedlessly over railroad crossings. Aside from the excellent moral effect, says a recent report, quoted in the *New York Times*, which the campaign had on the people who drive automobiles on Long Island, as well as on those pedestrians who use the crossings daily, the records show substantial decreases in the loss of life, and large reductions in the number of injuries sustained. In 1918, there were 27 persons killed and 209 injured on the Long Island Railroad crossings. In 1919, the list dropped to 10 killed and 29 injured, and for the first seven months of this year the records show only 4 killed and 7 injured.

"Unfortunately," it is stated, "irresponsible persons unlawfully and deliberately dash through crossing-gates that have been lowered to protect the public on the highways against the danger of collision with approaching trains. There is but one effective way to handle such speed maniacs when they are finally caught, and that is for the state authorities to revoke their licences.

"About six years ago it was a common practice for automobile drivers on Long Island to break off between 150 and 200 crossing-gates in the course of the year, while from 15 to 20 other reckless drivers, attempting to beat trains over the crossings, would run their cars up against the side of trains."

In the latter part of 1918, the Long Island management appointed a General Safety Committee and six Sectional Safety Committees, composed of officers and employees, for the purpose of further developing safety of train operation as well as to prevent and minimize accidents among employees. Through the workings of these committees very beneficial results in the direction of increased personal safety have been obtained.

The safety obtained by the Long Island Railroad has not been maintained throughout the country. Seventy per cent of those

killed or injured at grade crossings in a three-year period were motorists, according to figures compiled by the Interstate Commerce Commission. They show, reports the American Automobile Association, which is preparing a national campaign on the subject of highway safety, that in spite of the combined efforts of railroad, highway officials and automobile clubs, the total number of accidents continues annually at about the same rate. The number of such accidents and deaths for the calendar years 1917, 1918 and 1919, as compiled by the Interstate Commerce, is

Year	Killed	Injured	Total
1917	1,976	4,764	6,733
1918	1,852	4,683	6,535
1919	1,784	4,616	6,400
Total 3 years.....	5,612	14,063	19,668

These accidents include all persons who were killed or injured by railroad trains striking or being struck by trolley cars, automobiles or other vehicles and by trains striking pedestrians. The following figures show the accidents to motorists:

Year	Killed	Injured	Total
1917	1,083	3,000	4,093
1918	1,131	3,109	4,240
1919	1,232	3,558	4,790
Total 3 years.....	3,446	9,667	13,123

Thus it appears that nearly 70 per cent of those injured and killed during the three-year period were motorists, and that such accidents are increasing. During the half-year ended June 30, 1920, there were 1,302 motorists killed at grade crossings in the United States.

That preventive measures are becoming more effective in some states than in others because of grade crossing eliminations, more cautious driving and the protection of crossings by gates, bells, etc., is indicated by the fact that the deaths occurring are not always in direct proportion to the number of machines registered in the state. While New York gained first place in registrations, more motorists were killed in Ohio. Likewise, Pennsylvania, running third in 1919 registrations, has fifth place on the death list. Massachusetts was tenth in registrations, but twenty-fourth in fatalities.

More people were killed in Delaware in

THE AMERICAN CITY

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Making Road Funds Go Further

The "Caterpillar's" field of usefulness is by no means limited to road work. On farm and ranch, in the mining, oil and lumber industries—wherever power and endurance are at a premium, the "Caterpillar" has no real competitor

Cost figures prove that the Holt "Caterpillar"* Tractor can be used profitably in more phases of road work than any other method or machine. That's why hundreds of new "Caterpillars"* are getting into action this spring on road work all over the country. Used singly or in fleets, the savings a "Caterpillar"* will effect are enormous. Because of its speed, power, flexibility and endurance, "Caterpillar"* supremacy is solidly established for all kinds of road work. Now is the time to act. The road funds you can save with "Caterpillars"* this season will more than pay for the equipment. Write, telephone or wire for further information.

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** There is only one "Caterpillar"—Holt builds it. The name was originated and is owned exclusively by this company. Infringements will be prosecuted.*

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proportion to the number of machines registered than in any other state. Florida occupies second place on this unenviable list. In South Dakota there were fewer motor-

ists killed in proportion to the number of machines registered than in any other state. Massachusetts occupies second place, with Maryland third.

City Planning in the Flowery Kingdom

By Luther Gulick

New York Bureau of Municipal Research

THE largest cities of Japan are embarking upon extensive city planning improvements. In these projects the plans and experience of American cities are being carefully studied. According to a report to the New York Bureau of Municipal Research from the *Trans-Pacific*, the trading and manufacturing center of Osaka, a city of a million and a half population, is sending its chief engineer, Dr. Naoki, to the United States to study city planning and street and highway construction. An American paving company has already made arrangements for laying 6,000 yards of test paving in Osaka, and similar strips in Tokyo and Kobe.

The picturesque, narrow and unpaved streets of Japanese cities are insufficient to carry the growing streams of traffic. There are no cities in the world that have changed so suddenly from a medieval feudal civilization to a modern industrial era. In this process Japan has outgrown her cities, and the inadequacy of the old street plans is proving a serious handicap.

The city of Osaka is launching a ten-year street improvement program, including widening, paving and boulevard construction. It is estimated that the cost of the program will be \$70,000,000. On the basis of present plans, \$45,000,000 of this will go toward the payment of damages for street widening, \$10,000,000 for bridges, and the balance for grading, foundation work, paving and the planting of trees along the two-course boulevard which will stretch two miles from the railway station to the Tennoji Park. This boulevard will be 125 feet wide. The secondary thoroughfares will be 96 feet wide, and the remaining streets will vary in width from 48 feet to 96 feet. In all there will be 50 miles of new paving laid.

In Tokyo a somewhat similar plan is being followed. A ten-year program, to

which the Imperial Government has agreed to carry one-third of the cost. The first project will be a paved thoroughfare crossing the city between the Shiba and the Ueno parks, and cutting through the Ginza, the great retail center of Tokyo.

Kyoto has adopted a program calling for the expenditure of \$17,500,000, while Kobe is spending \$7,400,000 (of which the central government will contribute one-third), and Nagoya a total of some four million dollars. Yokohama plans provide for the construction of eight highways radiating from the business district, and a network of narrower streets from these main arteries.

Coupled with the city planning improvements which are now being made in the largest cities of Japan is the construction of interurban highways. The short distances between many of the great cities, and the arrival of the automobile and the motor truck, have given great impetus to the "better roads" movement. A 20-mile highway, 65 to 70 feet wide, is to be built between Tokyo and Yokohama, and Osaka and Kobe are to be connected with a similar 18-mile stretch.

Climatic conditions in Japan place a peculiarly difficult problem before the highway engineer. During the rainy season there is a continuous rainfall for from two to three months. In the country districts the fields and rice paddies are flooded, and road foundations are thoroughly saturated and, surface erosion excessive. The streets of the cities which are unpaved and without sidewalks throughout the interior become a quagmire of mud and puddles in spite of the lateral open ditches and drains that serve also as the sewerage system. If the Japanese highway engineers succeed in meeting these conditions satisfactorily, it will not be long before Occidental engineers will be visiting Japan to learn their methods

THE AMERICAN CITY

Old Bess Eats 'Em Up.

THE universal application of the P & H Excavator-Crane, makes those who use it enthused to such an extent that they call her "Old Bess."

As one contractor said: "I've been working in the earth, mining and contracting and the like for 20 years and *never* saw a machine like "her" before. She'll dig the ditch, lay the tile and cover it all up again.

"On a street job recently she again showed her class. We tore up the old macadam road and built a new one almost with no help other than the old girl. She unloaded cars, loaded trucks with crushed stone, dragged wagons, pushed paving mixers. She just thrives on hard work."

The P & H Excavator-Crane goes anywhere, needs no tracks and requires no steam engineer to operate—a high duty gasoline engine furnishes the power.

"Old Bess," as this general utility machine is nicknamed, is light on her corduroy tractor feet, swings her boom through a complete circle, and is performing to satisfied audiences in all parts of the country.

See her in many poses in the January, 1921, edition of Bulletin 5X.

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The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing
Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

City Ordinance Designed to Prevent Fraudulent Sale of Stocks and Securities, Held Invalid

The general welfare clause of a municipal charter is not broad enough to justify a city in adopting an ordinance forbidding unlicensed sale of stocks and other securities within the city, holds the Court of Common Pleas for Allegheny County, Pa., in the case of *Hawkins vs. City of Pittsburgh*, 12 Pennsylvania Municipal Law Reporter, 97.

Following the general outlines of the "blue sky" laws in force in several states, the defendant city adopted an ordinance designed to prevent the fraudulent sale of corporate stocks, etc., by requiring a showing of assets back of shares and bonds offered for sale. Reluctantly the Court held that the ordinance constituted an excess of the city's power, saying:

"It is, of course, admitted that the city has only such power to make ordinances as is granted it by its charter. When challenged by the plaintiff to show authority in the city charter for the making of the ordinance, the city points to what is commonly called the General Welfare Clause, which provides that the city may make ordinances 'in addition to the special powers in this section granted for the proper management, care and control of the city and its finances, and the maintenance of the peace, good government and welfare of the city and its trade, commerce and manufacture.' It is contended that the ordinance in question is proper for the maintenance of the trade and commerce of the city. The extent and scope of this clause of the city charter has seldom been the subject of judicial inquiry in this state. One thing is certain, that it does not authorize the city to legislate generally on all subjects which the Council might consider beneficial or necessary. An act of the Legislature expressly giving such powers to the city would be void for the reason that the Legislature cannot delegate its powers. It seems to us that the clause substantially means that in addition to the enumerated specific powers contained in the charter, the municipality may make reasonable ordinances upon all the matters and subjects ordinarily recognized as municipal.

"It is further contended by the plaintiff that even if the Legislature had specifically granted the power to make such an ordinance to the city, the result would be special legislation forbidden by the constitution, because it is contended the Legislature itself has no power to make a law in regard to stocks and bonds and to designate what stocks or bonds may or may not be sold, unless that law is general, and that such a law, applicable only to cities of the second-class, would be unconstitutional and void, and this for the reason that the sale of stocks and bonds, and the investment of monies in the same, is not in any sense a municipal matter.

"It is with great reluctance that we find ourselves compelled to agree with these contentions of the plaintiff, and to hold that the ordinance in question is void. It is forcibly argued on the part of the Director of Public Safety that there is great need for regulation of the kind provided for by the ordinance, and experience in the courts from day to day shows the necessity of such regulation. That people should be protected in the purchase of bread and vegetables, and not in the purchase of stocks and bonds, seems indeed to be neglecting the weightier matters of the law, but the assise of bread and the control of markets has always been deemed a municipal function and their regulation within the power of the city, whereas the investments of its citizens, and that is what is in question here, have never been supposed to be subject to municipal regulation and are not local and confined in their effects to the limits of the city, as is the regulation of the market. The subject is one which fully deserves the careful consideration of the Legislature."

Increase of Gas Rates Limited Except Under Authority of Public Service Commission

Gas companies operating under franchise granted by New York municipalities cannot increase charges for service beyond the maximum rates prescribed by such franchises, without authority from the Public Service Commission. (*New York Supreme Court, Appellate Division; Town of North Hempstead vs. Public Service Corporation of Long Island, and Village of Mt. Morris vs. Pavilion Natural Gas Co.*; 183 New York Supplement, 792.)



Cletrac Saves Money on Road Work

ON road work, Cletrac speeds up the hauling from rock crushers, sand piles and concrete mixers. It handles two loaded dump wagons over a soft new roadbed or the rough torn up surfaces of old roads.

It hauls twice the load a team of horses will and does it faster. Then, too, Cletrac doesn't have to be fed when it isn't working.

Cletrac can also be used for many other municipal jobs such as cleaning out gutters, snow clearing and operating concrete mixers, pumps and small stone crushers. New York City owns 100 Cletracs for snow clearing alone.

See the Cletrac dealer near you for a demonstration or write direct to us for the booklet "*Building Better Roads.*"

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SPECIFICATIONS

Horsepower: 12 at draw-bar, 20 at belt pulley.
Length: 96 inches.
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Height: 52 inches.
Weight: 3455 pounds.
Turning Circle: 12 feet.
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Belt Pulley: Dia. 8 in., face 6 in.

Cletrac
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City Not Ordinarily Liable for Interest on Money Due Contractor

A city is not liable for interest on money due a contractor for work done for the city unless there is an express provision for the payment of interest or unless the amount due is wrongfully withheld from the contractor. (Massachusetts Supreme Judicial Court, *Goldman vs. City of Worcester*, 128 Northwestern Reporter, 410.)

An Ordinance Segregating Manufacturing and Commercial Districts Authorized by Amendment to Massachusetts Constitution

A decision of the Massachusetts Supreme Judicial Court holds that the provisions of the Massachusetts constitution, as amended, empowering the General Court to limit buildings, according to their use or construction, to specified districts of cities, authorize an ordinance segregating manufacturing and commercial districts from residential districts. (127 Northeastern Reporter, 525.)

The Court says that, independent of this constitutional provision, amendment 60, such an ordinance might be warranted under appropriate circumstances, at least to a limited extent, in the interests of the public health, safety and morals, and adds:

"The establishment of fire limits, the exclusion of wooden buildings therefrom, and the requirement of buildings of specified construction within them, are familiar police regulations of unquestionable validity. Restrictions respecting air spaces and distances between outside walls of buildings, interior fire-proof walls, fire-escapes and kindred matters, are not uncommon. . . . A limitation of the height of buildings varying according to different districts had been upheld before the amendment.

"It has been decided quite generally, if not universally, by courts in which the question has been raised, that esthetic considerations alone or as the main end do not afford sufficient foundation for imposing limitations upon the use of property under the police power. . . . Before the adoption of amendment 60, it was said by Chief Justice Knowlton . . .:

"The inhabitants of a city or town cannot be compelled to give up rights in property, or to pay taxes, for purely esthetic objects; but if the primary and substantive purpose of the legislation is such as justifies the act, considerations of taste and beauty may enter in, as auxiliary."

"We think that this is an accurate statement of the property rights under the Constitution of the United States. While the Supreme Court of the United States has not decided, so far as we are aware, that the exercise of the police power cannot rest on esthetic considera-

tions alone as its sole basis, we draw the inference from what has been said on the subject that at present at all events that foundation, standing alone, hardly would be regarded as sufficient, but it may be regarded in a subsidiary way."

Officials Acting Outside Powers of Town—Town Held Not Liable

A Massachusetts town is not liable for malicious prosecution or abuse of civil process by its officers and employees as a means of expelling persons from the town, holds the Massachusetts Supreme Judicial Court in the case of *Broen vs. Town of Edgartown*, 128 Northeastern Reporter 1.

"In this commonwealth a town in its corporate capacity will not be bound, by express vote or by subsequent ratification, to the performance of contracts or to answer in damages for the torts [wrongs] of its servants and agents where the acts and duties were in their nature unlawful or prohibited, or were wholly beyond the powers of the town as not coming within the scope of the objects and purposes for which it was incorporated.

"A town in Massachusetts never had a common-law or statutory right to 'warn out' and expel persons merely because such persons were undesired, through persecution, using as instruments thereof criminal conspiracy, abuse of civil process, and false and unfounded complaints to the Court. As a matter of law, the absence of such power and the consequent illegality and utter inefficacy of a vote passed for such purpose must have been known and understood at the time the vote was passed authorizing or ratifying the acts."

Exclusive Contract for Garbage Removal Held Valid

An ordinance, providing for removal of garbage from a city under exclusive contract with the city and forbidding others to engage in the occupation of garbage removal, is a valid exercise of the municipal police power in the interest of promoting the public health. (Missouri Supreme Court, *Valley Spring Hog Ranch Co. vs. Plagmann*, 220 Southwestern Reporter, 1.)

Although No Services Rendered, City Liable for Salary of Employee

The Court of Common Pleas for Lackawanna County, Pa., holds that a city is liable for salary of an officer or employee, although he may not have rendered services during the time covered by his salary claim, if he reported for duty and was told that he would be sent for when wanted and if he stood at all times ready for duty. (*Storms vs. City of Scranton*, 12 Pennsylvania Municipal Law Reporter, 100.)

THE AMERICAN CITY

Street and Road Building by Tractor

QUICKER—CHEAPER

Below is illustrated a Best Tracklayer "Thirty" hauling a road leveler. In putting through new streets and roads, in the maintenance of established highways, Best Tracklayer Tractors furnish the power needed to shove through the work without delays and at less cost than with animals.

Flexible, compact, easily managed, unaffected by heat, cold or long-continued stretches of work.

Many years of actual practical operation in territories notoriously severe on tractors has proven Best design, choice of materials and workmanship correct in every detail. Best is one of the pioneers in the tractor industry and Best Tractors have won a wide and enviable reputation on the big heavy duty work of the West and elsewhere.

Best Tracklayers are built in three models—Tracklayer "Sixty"—"Cruiser" (Sixty)—Tracklayer "Thirty." Write for catalogs, prices, specifications, name of nearest dealer.

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Ordinance Providing for Regulation and Inspection of Barber Shops Upheld as Within Police Power of City

A decision of the Texas Court of Civil Appeals at San Antonio upholds the validity of an ordinance of defendant city, which provides for the regulation and inspection of barber shops and all of their equipments and appliances in the city, and the periodical examination of all persons who may engage in the occupation of a barber, in order to ascertain if he is "free from any infectious, contagious or communicable disease and any venereal disease in a communicable form," and to require the payment of license fees to cover the cost of inspection. It is held that the ordinance is well within the police power of the city to promote the public health, that the requirement for a license fee covering the cost of inspection does not constitute an improper deprivation against barbers, and that the ordinance properly forbids operation of a barber shop in connection with sleeping or living rooms.

An Invalid Ordinance Which Sought to Prohibit Public Meetings Upon Street or in Parks Unless Permitted by Mayor or Council

The Florida Supreme Court holds that an ordinance which prohibits the holding of any public meeting of any character upon any street, or in any city park, without permission from the mayor or a majority of the city councilmen, is void for unreasonableness, in the absence of special charter authority for adoption of such measure. (*Anderson vs. Tedford*, 85 Southern Reporter, 673.) The Court says:

"This discretion vested in the mayor or a 'majority of the city councilmen' is uncontrolled by any definite and reasonable terms on which the permit may be granted. Those officials are empowered to grant or withhold permission to hold meetings in the streets or parks of the city without inquiring into the character of persons applying for permit, the purpose of the meeting or assembly, nor its effect upon the business, traffic, or peace and quiet of the city, but may for reasons entirely personal grant permission to any person and withhold it from another, and as the religious or political proclivities of the head of the city administration change he may grant permission to a representative of one sect and deny it to another, and withhold permission from a person of one political faction and grant it to another of different persuasion. Public meetings upon the streets or parks of a city are not necessarily

productive of disorder, nor are they so likely to produce danger as to be in themselves producers of public disturbances.

"The ordinance recognizes this to be true, but it does not fix and determine the conditions applicable alike to all applicants under which meetings may be lawfully held. It merely leaves it to the uncontrolled discretion or caprice of the mayor or a majority of the city councilmen. Such an ordinance is unreasonable and void."

Implied Power of Village to Erect Hall—Canvassing Bond Elections

The Minnesota Supreme Court, holding that a village has implied power to construct a municipal hall, says in the recent case of *Powers vs. Village of Chisholm*, 178 Northwestern Reporter, 607:

"Village halls have been erected throughout the state from early times without serious question of authority in the village. The village must transact public business. The power to provide a place in which it may be transacted is essential to the existence of the village. The authority to erect a village hall is incidental to the maintenance of village government. . . . It has power to construct a village hall, though such power is not expressly conferred."

The same opinion holds that under a statute requiring vote by a "majority of those voting at the election" before bonds may be issued for a municipal purpose, blank ballots should be rejected in determining whether the requisite vote has been cast.

West Virginia Cities Not Amenable to Garnishee Process

In view of the fact that in some states it is held that funds in the hands of a municipal corporation owing to an individual may be garnisheed in a suit against such individual by one of his creditors, it is interesting to note that it was lately decided by the West Virginia Supreme Court of Appeals that municipal corporations in West Virginia are not liable to garnishee process, and this exemption from such process is not personal, but is upon grounds of public policy, and cannot be waived by the corporation. And it is held that in a suit by a third party against a creditor of a municipal corporation, the treasurer, in whose hands are the public funds, cannot be made a garnishee upon the grounds that the municipal corporation has directed the payment of a certain sum to such creditor. (*Leiter vs. American-LaFrance Fire Engine Co.*, 104 Southeastern Reporter, 56.)

THE AMERICAN CITY

PACKARD



Heavy Duty Packards—Standard

Fifteen years ago, the city of Detroit purchased its first Packard Truck. Today this same truck is working faithfully shoulder to shoulder with newer Packards built as late as 1921.

In the service of the city, and under the competitive conditions this service imposes, heavy duty Packards have demonstrated their power, economy, and steadfast stamina.

Already the municipality owns and operates 87 Packards.

As their other trucks wear out or become too expensive to operate, Detroit has replaced them with heavy duty Packards.

Packard Trucks consistently perform at low cost and with sure dependability. They are powerful and strong. They are expertly rated to the work required of them. They have the advantage of local service facilities established to maintain every Packard as a unit of high earning ability.

PACKARD MOTOR CAR COMPANY · DETROIT

Ask the man who owns one

Municipal and Civic Publications

HOW TO MEET HARD TIMES

A Program for the Prevention and Relief of Abnormal Unemployment. Edited by Bruno Lasker, and published as a supplement to *The Survey*, February 5, 1921. 16 pp. New York City.

A summary of a report made in December, 1917, by the Mayor's Committee on Unemployment of the City of New York, which had been appointed "to deal constructively with the problem of unemployment and prepare against a recurrence of unemployment crisis." Although the report was made some time ago, it is no less applicable to the present situation.

JOLIET CITY PLAN

Prepared by Messrs. Edward H. Bennett and William E. Parsons, of Chicago, Ill. Published by the Joliet City Plan Commission, Joliet, Ill. 1921. 45 pp. Maps and illustrations.

The report covers such subjects as the street system, railway problems, zoning, parks, water-front development, and a number of special features, such as an airplane station, retail markets, etc.

PUBLIC HEALTH

"Is Your Community Fit?" Published as Reprint No. 517 from the Public Health Reports of 1919, by the United States Public Health Service. Pertinent questions on community health and sanitation, with definite suggestions for bettering conditions. (Apply to United States Public Health Service, Washington, D. C.)

TENEMENT HOUSING

"A Tenement House Survey in Cincinnati." Published in the March, 1921, number of the Bulletin of the Women's City Club, Cincinnati, Ohio. The survey of tenement housing was made and the report prepared by the Cincinnati Better Housing League, under the supervision of Ethel Ideson, Assistant Secretary. (Apply to the publishers.)

NEBRASKA MUNICIPAL REVIEW

Published quarterly by the League of Nebraska Municipalities. The Review made its first appearance just before the war, when two issues were published. Its regular reappearance begins with the number of January, 1921. (Apply to Harry S. Villars, Editor, Tecumseh, Nebr.)

SANITARY ENTOMOLOGY

William Dwight Pierce, Ph.D., Editor, Consulting Entomologist, formerly Entomologist, South Field Crop Insect Investigations, U. S. Department of Agriculture, Bureau of Entomology, Gorham Press, Boston, 1921. XXVI + 518 pp. Illustrated.

Prior to the entry of the United States into the World War Dr. Pierce planned and inaugurated a correspondence course through the Bureau of Entomology, by which sanitarians of all stations in the United States were enabled to secure and take part in discussions of various entomological problems at short intervals. This course proved invaluable to army, navy and marine corps sanitarians, who took advantage of its information. The present volume is a compilation of the weekly letters and discussions sent out during 1918, but greatly enlarged, revised and brought up to date. It approaches sanitary problems from the standpoint of the sanitarian, the veterinarian, and even of the business man and private householder. This book contains authoritative statements of ten experts, who speak from personal knowledge, gives information regarding disinfection of garments, drainage problems, disposal of garbage, excreta and manure, handling of hog-pens, chicken-yards and many other household problems. At the end of the book is a valuable tabulation of diseases, giving the disease, causative organism, insect transmitter, method of insect transmission, and nature of insect role, whereby even the sanitarian slightly informed in the science of entomology may, through cross-reference, secure much information for his own good in stopping a disease and checking the pest which is the evil-doer. This book will prove invaluable to municipal, county and all other health authorities, and should be found shortly on the desks of all who would have an unsurpassed reference volume always at hand.

SOCIAL WORKERS' GUIDE TO THE SERIAL PUBLICATIONS OF REPRESENTATIVE SOCIAL AGENCIES

Edited by Elsie M. Rushmore, with an introduction by Frederick W. Jenkins, Librarian of the Russell Sage Foundation Library, Russell Sage Foundation, New York. 1921. 174 pp.

This bibliography, arranged alphabetically and also by subject, will be especially helpful to social workers, who may turn readily to such sections as Epileptics, Kindergartens, Juvenile Courts, Open-Air Schools and the like, and find grouped thereunder the serial publications of representative organizations in those fields.

The publications listed above are for sale by their publishers. Those listed below are understood to be free upon application.

PURCHASING AND SUPPLY

"Purchasing, Stores and Accounting." Being Reports III, IV, and V of the Interim Reports of the Toronto School Survey. 1921. 47 pp. A discussion, with recommendations, of the purchasing and supply departments and accounting work of the department of education, issued by the Bureau of Municipal Research. (Apply to the Bureau of Municipal Research, 189 Church Street, Toronto, Ont.)

BUILDING REGULATIONS AND SAFETY

"Report on the Administration of the Bureau of Buildings in the Department of Public Safety of the City of Rochester." By the Rochester Bureau of Municipal Research, Inc. 57 pp. 1921. The report was prepared by Frank P. Cartwright, Assistant Engineer, for submission to the Mayor, Commissioner of Public Safety, and the Fire Marshal. (Apply to the Rochester Bureau of Municipal Research, Inc., Rochester, N. Y.)

RECREATION

Two pamphlets: "Comrades in Play," 1920, 84 pp, suggestions for leisure-time activities for men and women, published by Community Service, Inc., 1 Madison Avenue, New York City; "Layout and Equipment of Playgrounds," 1921, 60 pp., practical suggestions for planning and equipping playgrounds with diagrams of model grounds. Published by the Playground and

Recreation Association of America, 1 Madison Avenue, New York City, N. Y. (Apply to publishers.)

CIVIL SERVICE IN ST. PAUL

"Public Employment." The Seventh Annual Report of the Bureau of Civil Service of the city of St. Paul, Minn. 1920. 59 pp. Diagrams. Several pages are devoted to a discussion made by the city toward standardization of its employees. (Apply to Jesse Foot, Civil Service Commissioner, St. Paul, Minn.)

GEOLOGY OF NORTH CAROLINA

Biennial Report of the State Geologist, 1919-1920. Published by the North Carolina Geological and Economic Survey, Joseph Hyde Pratt, Director and State Geologist. 74 pp. 1921. Includes a list of the publications of the Survey. (Apply to Joseph Hyde Pratt, State Geologist, Chapel Hill, N. C.)

CONSERVATION IN INDIANA

Second Annual Report of the Department of Conservation of the State of Indiana for the year ending September 30, 1920. 123 pp. Diagrams and maps. Includes reports and recommendations from the Division of Geology, the Divisions of Entomology, Forestry, Lands and Waters, and Fish and Game. (Apply to Richard Lieber, Director, Department of Conservation, Indianapolis, Ind.)



The Transportation Problems in Municipal Work are Varied—

Many times a certain type of equipment is purchased for a specific job and the amount of work involved is not sufficient to keep the equipment even partially busy.

Many times more than one problem can be solved by a combination of bodies or equipment, thereby using one motor truck chassis instead of several.

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Capacities 1½ to 7½ Tons. Tractors to 15 Tons

CITY PLANNING IN PORTLAND, ORE.

"Major Traffic Street Plan, Boulevard and Park System for Portland, Ore." 97 pp. Maps and illustrations. Published as Bulletin No. 7, by the City Planning Commission, Charles H. Cheney, Consultant. 1921. A thorough discussion of street traffic problems and their solution in Portland. (Apply to Charles H. Cheney, Consultant, City Planning Commission, 424 City Hall, Portland, Ore.)

WATER-SUPPLY

"The Production of Wholesome Water for Municipalities," by L. O. Bernhagen, A. C. Editor, Texas Water-Works Association, Austin. 62 pp. 1920. Illustrated. The purpose of this pamphlet is to present in a condensed form information which will be of assistance to operators of water filtration and sterilization plants where no regular chemist or bacteriologist is in attendance. (Apply to V. M. Ehlers, Secretary, Texas Water-Works Association, Austin, Tex.)

TRAFFIC REGULATION

"The Anti-Parking Ordinance, Chicago. Communications of the Superintendent of Police, The Chief of Fire Prevention and Public Safety, and the Commissioner of Public Service; also an outline of the most important facts presented to the Committee on Local Transportation. Issued by the Committee on Local Transportation, Dec. 3, 1920. (Apply to Ulysses S. Schwartz, Chairman of the Committee, Council Chambers, Chicago, Ill.)

STREET CLEANING

Report of the proceedings of the Conference of Street Cleaning Officials, organization meeting of the International Association of Street Cleaning Officials, Chicago. October, 1920. 15 pp. Illustrated. (Apply to A. M. Anderson, Secretary, 1314 Old Colony Building, Chicago, Ill.)

THE PARKS OF CONNECTICUT

"Connecticut State Parks." Report of the State Park Commission for the twenty-one months ended June 30, 1920. State of Connecticut, Public Document No. 60. 59 pp. Illustrated. (Apply to Lucius F. Robinson, Chairman of the Commission, Hartford, Conn.)

TIME STUDY

"Time Study and Motion Study as Fundamental Factors in Planning and Control—An Indictment of Stop-Watch Time Study," read before the New York Section of The Taylor Society, December 16, 1920. By Frank B. Gilbreth, Member of The Taylor Society, and L. M. Gilbreth. 16 pp. (Apply to Frank B. Gilbreth, 68 Eagle Rock Way, Montclair, N. J.)

PURCHASING HOUSEHOLD SUPPLIES

"Buying Commodities by Weight or Measure." Published as Miscellaneous Publication No. 45, Bureau of Standards, Department of Commerce. 42 pp. 1920. Illustrated. Extracts adapted from Bureau of Standards Circular No. 55, "Measurements for the Household." (Apply to Bureau of Standards, Department of Commerce, Washington, D. C.)

GAS SERVICE

"Standards for Gas Service." Circular of the Bureau of Standards, Department of Commerce. Fourth edition. 140 pp. 1920. (Apply to S. W. Stratton, Director, Bureau of Standards, Washington, D. C.)

A EUROPEAN TOUR WITH A PURPOSE

"Civic Tour to Europe." Program and itinerary of tour to start June 7 arranged especially for business men and students of social and industrial relations. (Apply to M. E. Bailey, Intercollegiate Tours, 65 Franklin Street, Boston, Mass.)

CARE OF SHRUBBERY

"Pruning and Care of Shrubbery," by Frank A. Waugh. Extension Leaflet No. 7. 4 pp. Illustrated. (Apply to Extension Service, J. D. Willard, Director, Massachusetts Agricultural College, Amherst, Mass.)

CITY PLANNING IN CHICAGO

"A List of Suggested New Projects and of Improvements in the Making." 1921. 15 pp. (Apply to Charles H. Wacker, Chairman, Chicago Plan Commission, Hotel Sherman, Chicago, Ill.)

NATIONAL PLANNING

"A Nation Plan a Basis for All Local Planning," by Cyrus Kehr. 1920. 18 pp. An address delivered before the American Civic Association at Amherst, Mass. (Apply to Eleanor E. Marshall, Secretary, American Civic Association, Union Trust Building, Washington, D. C.)

FIRE LOSSES IN NORTH DAKOTA

Seventh Annual Report of the State Fire Marshal of North Dakota, for the year 1920. 13 pp. (Apply to H. L. Reade, Fire Marshal, Bismarck, N. D.)

THE ALLEGHANY STATE PARK

"A State Park for Western New York," by Edward F. Brown, formerly Camp Director, Palisades Interstate Park. Illustrated. An argument for and description of the proposed state park. (Apply to Chauncey J. Hamlin, President, Buffalo Society of Natural Sciences, Library Building, Buffalo, N. Y.)

ASSOCIATION OF FIRE ENGINEERS

Proceedings of the Forty-Eighth Annual Convention of the International Association of Fire Engineers, held at Toronto, Ont., July 26-29, 1920. Vols. I and II. 906 pp. The complete record of the convention. (Apply to James J. Mulcahy, Chief, Yonkers, N. Y., Secretary of the Association.)

WEIGHTS AND MEASURES

"Weights and Measures." Miscellaneous Publication No. 43 of the Bureau of Standards, Department of Commerce. Report of the Thirteenth Annual Conference of Representatives from various states held at the Bureau of Standards in May, 1920. 200 pp. 1921. (Apply to Bureau of Standards, Department of Commerce, Washington, D. C.)

WATER-SUPPLY OF KANSAS CITY

"Reports on the Water-Supply of Kansas City, Mo." Fuller and McClintock, Consulting Engineers. 205 pp. Maps. An exhaustive study of the water-supply of this city. (Apply to Emmett Lynch, Secretary, Board of Fire and Water Commissioners, Kansas City, Mo.)

WELFARE WORK IN RHODE ISLAND

Year Book, 1920-1921, of the League of Improvement Societies in Rhode Island. 36 pp. Illustrated. Account of the activities of the League and reports of the Standing Committees. (Apply to Luther D. Burlingame, Secretary-Treasurer, 15 Catalpa Road, Providence, R. I.)

Municipal Reports

Baltimore, Md.—The Ordinance of Estimates for the year 1921, with detailed statements of the appropriations for the maintenance of the government of the city for the fiscal year ending December 31, 1921. (Apply to Peter E. Tome, City Comptroller, Baltimore, Md.)

Chicago, Ill.—Twenty-third Annual Report, Department of Gas and Electricity, 1919. (Apply to William G. Keith, Commissioner of Gas and Electricity, Chicago, Ill.)

Duluth, Minn.—Twenty-second Annual Report of the Water and Light Department for the year ending December 31, 1921. (Apply to P. G. Phillips, Commissioner of Public Utilities, Duluth, Minn.)

Erie, Pa.—Fifty-second and fifty-third Annual Reports of the Commissioners of Water Works, for the years ending December 31, 1918-1919. (Apply to E. D. Carter, Commissioner of Water Works, Erie, Pa.)

Los Angeles, Calif.—Report of the Auditor for the fiscal year ending June 30, 1920. (Apply to John S. Myers, City Auditor, Los Angeles, Calif.)

New Bedford, Mass.—Report of the Special Committee on Garbage and Waste Collection and Disposal.

(Apply to W. H. B. Remington, City Clerk, New Bedford, Mass.)

Palo Alto, Calif.—Two reports. Eleventh Annual Report of the city, including the reports of the Certified Accountant, Board of Public Works, Board of Public Safety, Public Library Board, City Planning Commission and Community Center Commission, for the fiscal year ending June 30, 1920. (Apply to Frank Kasson, City Clerk, Palo Alto, Calif.) Annual Report of the Health Department for the year ending December 31, 1920. (Apply to Louis Olson, Health Officer, Palo Alto, Calif.)

Saginaw, Mich.—Annual Report of the Department of Light, Water and Sewers, 1920. (Apply to R. F. Johnson, Commissioner of Light, Water and Sewers, Saginaw, Mich.)

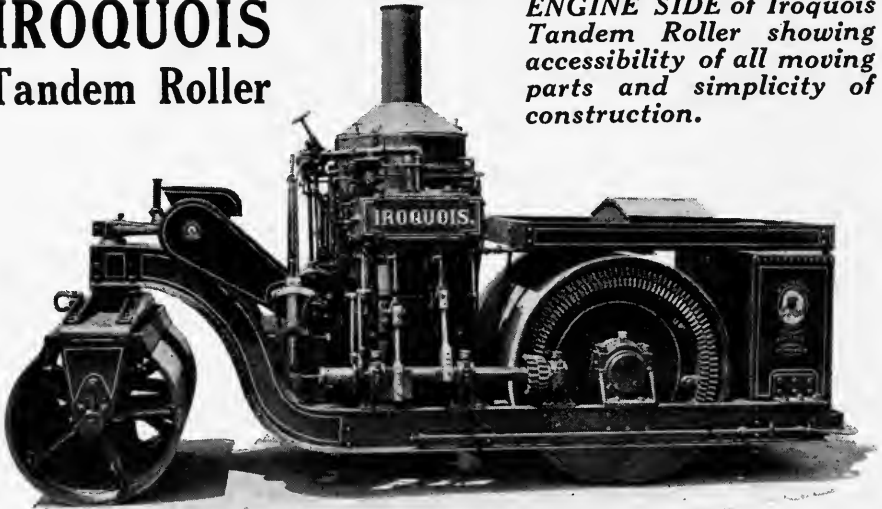
St. Louis, Mo.—Annual Report of the Board of Commissioners of Tower Grove Park, St. Louis, Mo., for the year ending December 31, 1920. (Apply to George O. Carpenter, Chairman, Board of Commissioners of Tower Grove Park, St. Louis, Mo.)

Winston-Salem, N. C.—Annual Report of the Department of Health. (Apply to R. L. Carlton, M.D., Health Officer, Winston-Salem, N. C.)



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Tandem Roller showing
accessibility of all moving
parts and simplicity of
construction.*



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Iroquois Tandem Rollers are used by most successful contractors in many parts of the world. Leading municipalities have adopted them as standard equipment. *There is a reason.*

Iroquois Tandem Rollers, like other products of the Iroquois Line, are the result of 40 years' experience in the designing and actual operation of street-paving and road-building equipment. Iroquois users profit by our experience.

Iroquois Tandem Rollers are built to last. They have a low-speed engine that insures high-power, quick reverse and long life. A separate two-cylinder, double-action engine gives power steer.

Iroquois Tandem Rollers are made in three sizes—2½-ton, 5-ton, and 8-ton. They are equally successful for rolling asphalt, brick, creosote block, macadam, grade or golf links.

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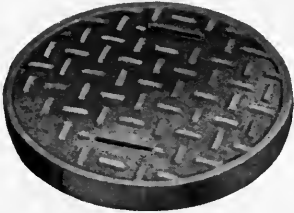
Philadelphia

Methods, Materials and Appliances

News for Boards of Public Works, Engineers, Contractors, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

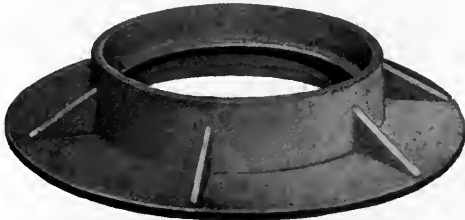
No More Broken Manhole Covers

One of the trials confronted by sewer departments and water departments is the broken manhole cover in a street subjected to heavy traffic. A light manhole cover when struck by a heavy truck is more than liable to crack, break, and cause a bad accident.



A NEW MANHOLE COVER
WHICH WILL SUPPORT
80,000 POUNDS

The Central Foundry Company, 90 West Street, New York City, claims to have entirely eliminated hazards of this kind with the new heavy-duty manhole cover which it is now manufacturing. This new cover, claimed to be immovable and unbreakable, is built to permanently withstand severe vibration and jarring, and will, without breaking, support loads up to 80,000 pounds. The cover is made of grey iron and is reinforced with nine ribs. It is 24 inches in diameter and 3½ inches deep, and the metal ribs are 1½ inches thick. The reinforced manhole casting which supports the cover is 25½ inches in diameter and at the bottom flange is 41 inches in diameter with an overall depth of 7 inches.



THE REINFORCED MANHOLE CASTING

Hand With Truscon Steel

The Truscon Steel Company, Detroit, Mich., and Youngstown, Ohio, has announced that Morgan Hand, Jr., has become special representative of that company on road and highway work with headquarters in Philadelphia.

Eliminate the Old Germ-Laden Drinking Fountain

Professors Clark and Dunlap and Dr. Whitaker, all well known throughout the United States as bacteriologists and investigators in the field of the sanitary drinking fountain, have revealed in their studies that the old-style drinking fountain was a most fruitful dispenser of germs, as the exposed head permitted the lips to rest upon it and suck from it, thereby planting the germs where the stream would elevate them to the properly positioned mouth of the next user.



A SANITARY DRINKING FOUNTAIN
WITH COOLER

The "Vertico-Slant" fountain, made by the Rundle-Spence Manufacturing company, Milwaukee, Wis., was primarily designed to overcome this unsanitary condition. It prevents contamination because the angle of the stream makes it self-cleaning although retaining the

THE AMERICAN CITY

MUSHROOM TRAFFIC LIGHT

MILWAUKEE TYPE



SCIENTIFICALLY DESIGNED

ACCIDENT PROOF

ALL LIGHT AT NIGHT

LARGE ENOUGH TO BE RESPECTED

LATEST AND BEST TRAFFIC UNIT ON THE MARKET

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ELECTRICAL & SPECIALTY SUPPLY CO.

Madison Terminal Bldg., CHICAGO, ILL.



Eureka Snow Plow

Horse Drawn Tractor Driven

Will mount curbs with ease and remove 24 inches of snow in one trip. The wings are adjustable to any width and either wing may be detached. One user writes regarding use with tractors, "The plow is so simple and the method of attaching so easy that these facts coupled with the reasonable price should make a strong appeal to all tractor owners interested in snow removal."

THE W. M. TOY COMPANY
Sidney Ohio



No matter WHAT drinking fountain you may put
INDOORS

← This
The MURDOCK
PATENTED

☞ **ANTI - FREEZING** ☞
BUBBLE - FONT

IS THE ONLY ONE THAT IS SAFE
TO INSTAL OUTDOORS BECAUSE

it is the only drinking fountain made that was designed and is built solely for outdoor use. It does not have to be turned off at the approach of cold weather.

**THE ONLY FOUNTAIN MADE
THAT IS STRONG ENOUGH
TO WITHSTAND PUBLIC
ABUSE.**

Write for fully illustrated literature to
The MURDOCK MFG. & SUPPLY CO.

**FIRE HYDRANTS
YARD HYDRANTS
HOSE BOXES**

CINCINNATI, OHIO
Builders of Water Service devices since 1853

copious drinking features of the vertical stream. The nozzle is located at the bottom of a recess protected by a wall on three sides, making it impossible to touch it with the lips. Furthermore, there is no hood provided with this fountain on which a user may rest his mouth when drinking. The type of construction prevents tampering and pilfering, and squirting, the cause of finger contamination, is difficult without wetting the operator more than the other fellow. The location of the nozzle at the bottom of the recess discourages the attempt.

This type of fountain uses less water than the old-style drinking fountain and can be used to fill a glass or cup as readily as from a faucet. Fifty of one type of Vertico-Slant fountains have been ordered for new Milwaukee schools, and two lots of another type were recently ordered by the Chicago School Board.

A Traffic Light that Stays in Place

A new type of traffic light which is attracting considerable attention and which has been used by Milwaukee since last August for the marking of traffic at street intersections, is known as the Milwaukee mushroom type traffic light. It marks the successful end of a long period of research and experimental work by the Bureau of Illumination of the city of Milwaukee in its search for a traffic light that would serve as an efficient marker by day and night, but which would not require continual replacement nor be responsible for the damage to property or loss of life that the high iron traffic post and red globe have proved to be.

Investigation showed that the city was losing about 400 traffic posts a year, of which less than half were being paid for by the party doing the damage. Various styles of low post of both wood and metal were tried out, and finally the present style unit was hit upon, and a number were made and put into service. The result was very satisfactory.

The unit cannot be knocked over or broken; it may be struck by an auto, but the wheel of the car will either slip off to the side or else ride over the unit without injury to tire or wheel; and, still more important, the light is located just where it should be for the best results, namely, on the ground directly in line with the driver's gaze as he approaches the corner; there is no chance of his missing it. The unit is rain-proof and has been found very satisfactory in winter. The snow does not prove any great inconvenience, as the unit

quickly clears itself, and even before that the red light penetrates the snow covering.

The mushroom light unit is in the form of a shell or button 8 inches high by 20 inches in diameter, made of cast steel so designed as to have sufficient strength to support the heaviest truck, yet letting out the light from within in such a manner that the whole shell appears as a ball of red light in the dark, the steel casing being invisible at a short distance away. Beneath the steel shell and spaced from it is a gold-ruby glass bowl, and within the bowl the source of light. Two 60- or 75-watt lamps are used, so that when one burns out, the second one will continue to light the unit. Fuses for the circuit are also mounted inside, so that it is self-contained in every respect. Because of its novel design, the unit needs no foundation, but merely requires the removing of a section of pavement for its installation.

The unit has proved to be specially well adapted for busy corners or narrow streets where space is at a premium. It may also be placed between car tracks without danger of accident. It is really accident-proof and made to stand the hardest kind of service. The light is being put on the market by the Electrical & Specialty Supply Company, of Chicago, Ill.

The George A. Johnson Company

George A. Johnson, well-known hydraulic engineer, has just announced the reorganization of Johnson & Benham, Inc., under the new name of the George A. Johnson Company, the members of which are George A. Johnson, Nelson B. Wolfe, Harold C. Stevens, Charles R. Wyckoff and Harry B. Joyce. This company will engage in municipal engineering at 150 Nassau Street, New York.



-A-TRAFFIC GUIDE THAT WARNS BUT DOES NOT DAMAGE

THE AMERICAN CITY

Better Illumination



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Better illumination of city streets increases civic pride, lessens accident and crime and improves business. King Standards with G.E. Novalux Fixtures furnish the solution.

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Commercial Fire Truck for Fire Department Service

The use of commercial trucks in large cities for fire department service is not a new idea, although there is still some prejudice against their use in some cities. Many of the larger cities, including Chicago, St. Paul, Detroit and New York, are using 1-ton Ford trucks. Many other large cities are using other commercial chassis of various sizes, depending on the work they are called upon to perform. These commercial trucks have been in fire department service long enough to prove their value; in fact, investigations will prove that repeat orders have been placed after the trucks have been thoroughly tested out.

Confronted by the necessity for economical expenditure of the city's funds, fire departments are still going ahead on motorization plans. They must do this just to keep even with the growth of their cities, to say nothing of replacing horse-drawn outfits. No local organization will question the economy of an efficient fire department, nor desire in any way to curtail the wise expenditure of city funds for the motorization of the fire department.

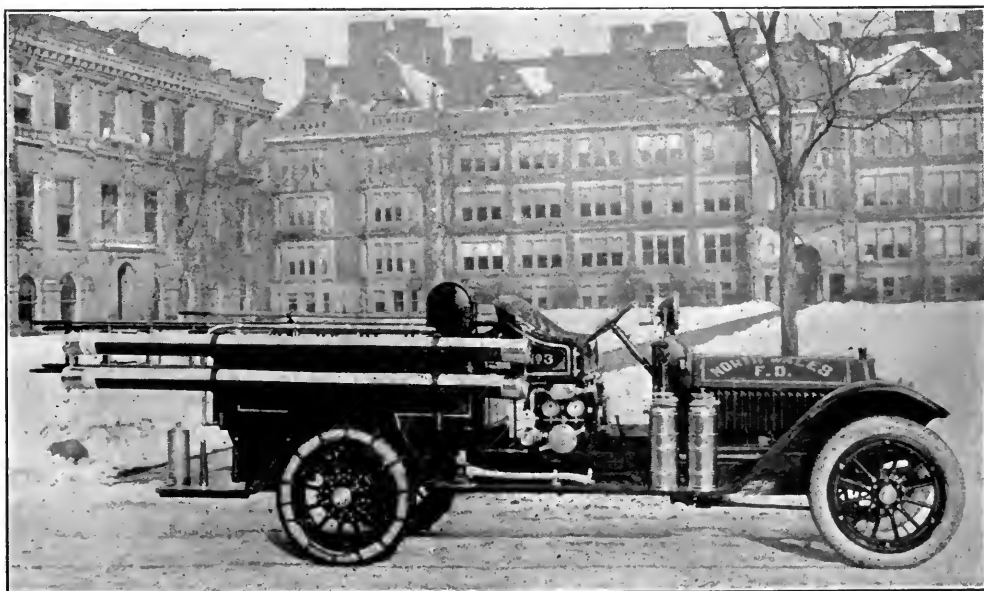
The very interest that citizens are showing in the proper expenditure of city funds has been an important factor in placing many commercial trucks in the fire departments of larger cities. Low up-keep has been the watchword of all commercial truck builders. Commercial trucks compete in every-day life with horses. They must run better, cheaper, more economically, and earn more than horses to

find a place in our busy commercial life of to-day. Of course, commercial trucks cannot handle every situation that may evolve in the every-day fire service of our larger cities. There must always be larger capacity pumpers, large aerial trucks, and some other specially built fire apparatus for work that no commercial truck can accomplish.

In addition to boosting home business, buying from the local truck dealer fixes the responsibility locally for the service that the job will give. The local taxpayer is more interested in seeing that anything he sells to his city will operate satisfactorily than any outsider ever could be. His business, his local reputation, his future are all tied up in his local dealings. The fire truck installation advertises him good or bad, as the case may be. Furthermore, who could be in a better position to give service on the part of the fire truck that needs the most service—the chassis, than the local dealer or taxpayer, who maintains a local shop, employs local mechanics and has fifty or one hundred thousand dollars tied up in repair parts at all times?

A Change in Troy Wagon's Personnel

The Troy Wagon Works Company, Troy, Ohio, has announced the resignation of G. R. Harris, formerly Secretary-Treasurer, and the appointment of W. J. Murray as General Manager and H. H. Tamplin as Secretary-Treasurer.



A TYPE OF FIRE APPARATUS ON A COMMERCIAL CHASSIS

A Northern hose and pumper mounted on a Locomobile chassis. Equipment consists of straight hose car materials and pump. On test the pump delivered 590 gallons per minute at 120 pounds net pump pressure when drafting water

Why let the close of day obscure the beauties of monuments or buildings? Floodlighting will enhance their charms at night.



Bathed with Light

THE charm of architecture and statuary once was blotted out when evening fell. Today, G-E Floodlighted, their beauty lives on through the night.

A floodlighted monument silhouetted against the darkness, stands out more conspicuously than in day time. Civic centers, libraries, clock towers, all lend themselves to this spectacular illumination. Their architectural beauties are enhanced by this flood of light.

The General Electric Company is a pioneer in the floodlighting field. Experienced in the design and use of this method of illumination its lighting specialists will willingly aid and advise you in your flood lighting problems.

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Wrestling with New York's Big Storm

Beginning at midnight February 19, and accompanied by a great gale, the heaviest snowstorm in twenty-one years blanketed New York City with 12½ inches of snow within twelve hours. Warned by the Weather Bureau, Chief John Kenlon of the Fire Department at an early hour sounded "14-14," the new snow-storm signal, which called thousands of men in the Fire Department and Bureau of Snow Removal to active duty. An important feature in the attack was the great fleet of Holt "Caterpillar" 5-ton tractors which had been purchased this winter for just such an emergency. They first attacked the main thoroughfares in the congested and business districts and operated continuously over the many routes laid out in advance, in conformity with the plan of keeping open the most important streets and thoroughfares and the approaches to bridges and ferries.

The struggle against the record-breaking snow-storm continued all day; and the tractors with their snow-plows mounted in front battered their way through the deepest snow-drifts, keeping open a continuous lane for traffic. By 7 o'clock Sunday night, Commissioner of Street Cleaning John P. Leo, said that over 930 miles of streets had been covered. Following the tractors were the numerous motor trucks and other equipment comprising the city's complete snow-fighting apparatus.

The next day Chief Kenlon said: "Fire danger from snow conditions is at an end. The streets are in such condition now as to give us little trouble in sending equipment to fight any blaze. The city won the wrestling match in this snow-storm by a clean fall. It is the first big snow-storm that has ever been handled within the first two days." Street Cleaning Commissioner Leo stated that the showing of the Department was a clear demonstration of the power of scientific attack on snow by modern methods. "Apparatus costing more than \$2,000,000 has been used for the first time on this snow," he said, "and in my opinion it has paid for itself already. If this had not been used, the private waste and loss to business in New York, due to obstructed streets, would have amounted to \$10,000,000. Snow is going to be fought largely by machinery in the future."

Holt "Caterpillar" tractors are used with straight-blade plows 10 feet 6 inches long, mounted in front and turned at an angle of about 45 degrees; they operate over routes



A 5-TON TRACTOR WITH A FULL BLADE OF HEAVY SNOW

laid out in advance, two machines to a route. The snow is thrown to the sides of the street, and the lanes are kept open for traffic. Later on, the tractors are equipped with plows similar in appearance but with two wings on either end. With these plows they attack the piles of snow thrown to the sides and push the snow to the manholes, which is known as "sewerage."

During the storm the 5-ton tractors operated below 14th Street, and they were highly successful in keeping all the main thoroughfares open, as well as the food districts. Later on, they were sent up-town, being used along Broadway, Riverside Drive and the side streets, between 59th Street and 110th.

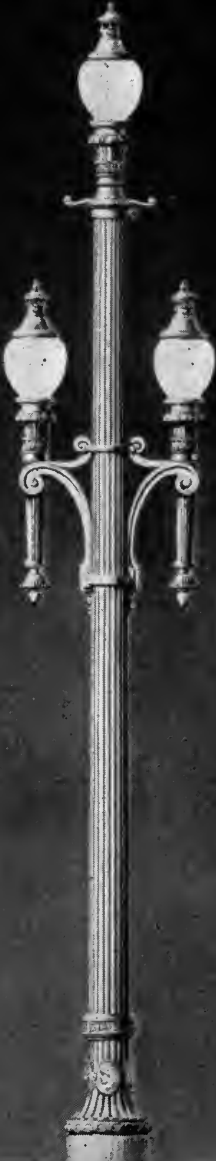
It is believed that it was fully demonstrated in this storm that a tractor of sufficient power, such as the 5-ton, which is rated 40 engine horse-power and 25 on the drawbar, is required to do really effective work in a fall of any consequence. The Holt tractors were at all times able to get through the deepest drifts, and at direct speed of three miles an hour, their high speed. It is a rather remarkable record that this great fleet of tractors was operated continuously for many hours in the most gruelling kind of work, and manned by rather inexperienced operators, and not a serious accident or breakdown was reported.

The town of Harrison, N. Y., with a single Holt 5-ton tractor similar to those used by New York City, kept open all the roads, and it was remarked that Harrison was the only city in Westchester County fully meeting the emergency.

When tractors were purchased by New York City for snow removal work, there may have been serious doubts in the minds of many people whether these machines would prove effective, but this storm demonstrated their value and efficiency.

THE AMERICAN CITY

*The New Salt Lake
City Standard*



Salt Lake City's New Lighting System

The Utah Power & Light Co. is now installing on State Street and Broadway handsome, large, three light standards, illustrated on this page.

This standard is conceded to be one of the largest and most handsome ever built for business district lighting. It was designed by W. D'a Ryan, Illuminating Engineering Laboratory, General Electric Co., Schenectady, N. Y., and manufactured by the Union Metal Manufacturing Co., Canton, Ohio.

Each pressed steel casing standard telescopes completely over a tubular steel trolley pole from which span wires are suspended. Lighting equipment consists of three ornamental, luminous arc lamps per standard.

This system represents the result of eighteen months' exhaustive study and experiment on the part of progressive Salt Lake City business interests, city officials and engineers of The Utah Power & Light Co. Their aim to obtain the finest business district lighting in the country has been realized both in the fine appearance of the new system and its superior illuminative value.

Union Metal and General Electric engineers will point out for you the "Right way for your White Way," whether your requirements be a large spectacular business district standard or a small, modest type for parkway or private grounds.

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**The Union Metal
Manufacturing Co.**
CANTON OHIO

UNION METAL LAMP STANDARDS

The Care of Park Lawns and Golf Courses

It is generally recognized by park superintendents that the best method of caring for park lawns and golf courses in this country, is the constant cutting of the grass to keep it short so that the long blades may not be matted on the surface. To accomplish this in many places by hand would require too much man power, thus running up the expense.

The Coldwell Lawn Mower Company, Newburgh, N. Y., has just brought out a quintuple mower which will prove a boon to caretakers of extensive lawns. This machine is composed of five 20-inch hand mowers so attached to the frame that there is ample flexibility to permit the mowers to conform very closely to any undulations in the surface of the ground. This quintuple mower can be readily drawn by a single horse or by the tractor, as shown in the illustration.

The particular advantage of the new mower, composed of 20-inch machines, is that it is not a "horse-killer," which was true of the older types of machines composed of three 30-inch machines, which must necessarily be built much heavier in order to support the longer blades. Another advantage of the quintuple mower is that the individual mowers may be uncoupled and, with the usual handle for hand mowing, be used in cutting small areas where a horse- or tractor-mower is not desirable. In this manner a city may equip itself with this quintuple mower and a sufficient number of handles and have available mowing machines for hand or power operation. Inquiries throughout the country show that more cities are now purchasing power-drawn mowers than horse-drawn, because the continual hammering of horses' hoofs on the turf tends to pack it too tightly in small spots, and horse-droppings cause the growing of many rank weeds.

Another important factor in caring for a lawn is the spring rolling, because where sod is heaved by frost, the roots are detached from the ground below and die out, leaving brown spots over the lawn. Rolling early in the spring brings these roots in contact with the ground below and saves them. Rolling should be continued throughout the entire season to maintain the sod in its best condition, and for this purpose power mowers of varying widths with rollers have been developed by the Coldwell Lawn Mower Company, and are used in many of the best parks and golf courses throughout the country.

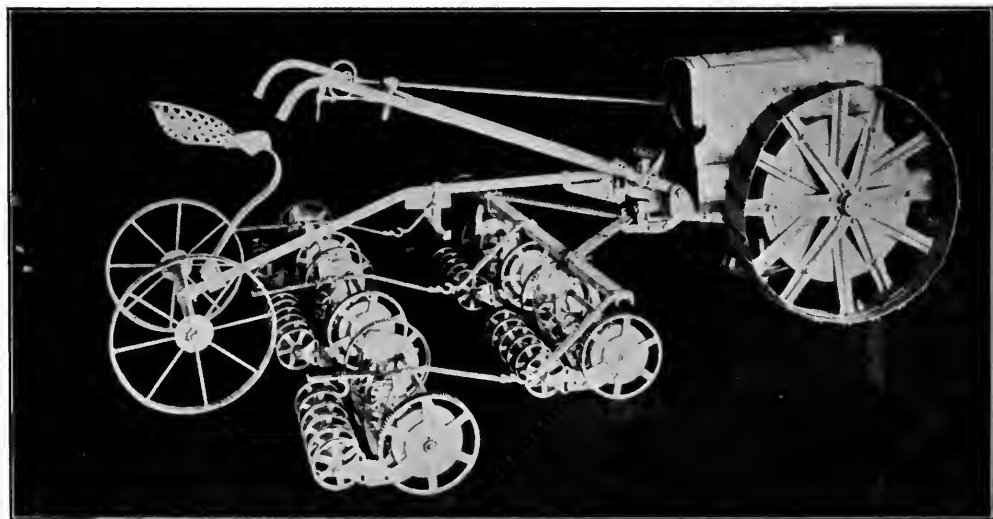
Matheny Joins Stutz Organization

James G. Matheny, who has until recently represented the Seagrave Company of Columbus, Ohio, has resigned and joined the Stutz Fire Engine Company, of Indianapolis. He will be in charge of the branch factory at 3415 Broadway, Kansas City, Mo.

Among the recent buyers of Stutz apparatus are: Arnold, Pa.; Duluth, Minn.; Bryan, Tex.; Newark, Del.; Pendleton, Ore.; Waukegan, Ill.; Williamsport, Pa.; all of which cities have purchased 750-gallon Stutz triple combinations, and Lake Forest, Ill., where a 500-gallon Stutz pumper will soon be in service.

Hoeltge Returns to Central Foundry

Henry Hoeltge, until recently Western Advertising Manager for the Plumbers' Trade Journal, has been appointed advertising manager for the Central Foundry Company, 90 West Street, New York City. Mr. Hoeltge was with the Central Foundry for a number of years prior to entering the United States Army in 1917.



A QUINTUPLE MOWER WITH TRACTOR, SUFFICIENTLY LIGHT AND FLEXIBLE TO PROVE VALUABLE FOR PARK LAWNS

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HABIRSHAW maintains a Mechanical Research Laboratory for the purpose of developing insulation to meet the demands of the various new service requirements continually arising.

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Lessons to Be Learned from Bridgeport's Experiment in Housing

By W. H. Ham

General Manager, Bridgeport Housing Company

IT is safe to say that the most outstanding fact of the housing work in Bridgeport is the general response to the work of the architect and town planner. Good taste is appreciated. Next to this is the feeling of satisfaction of those who live in these houses—the feeling that they are homes, and that the cleanly and attractive surroundings are helpful in the matter of self-respect and assurance of the future.

These working people have ambitions to advance to a social environment where the children can be protected from the debasing influences of the crowded districts. This is a real demand, and the Bridgeport program has helped many families with growing children into better conditions of living which satisfy this demand.

Some of the basic principles back of housing these people and the details of the problem have been tested out here in Bridgeport. The narration of the experiences of this city merit attention. A few of these are cited below:

1. The working man to-day demands a decent home.

2. The minimum requirement for one family is entirely different from the minimum requirement of another family in the number of rooms. The minimum demand changes during early married life with the advent of children.

3. The working man will seek as nearly as possible a minimum which satisfies his requirement.

4. From our experience with renting apartments and houses, three rooms and a bath constitute a minimum and make an exceedingly popular unit. Next in popularity is four rooms and a bath, next five rooms and a bath, and after that, six rooms and a bath in a detached house.

5. The working man to-day demands a share in ownership. The demand is not fully crystallized, but should be stimulated as a great stabilizing influence in manufacturing communities.

6. To-day he will undertake a contract which appears to be free from paternalistic influence, if the initial payment is small. This has been absolutely proved in the housing work in Bridgeport.

7. It is not practical to build a three-room individual unit suitable for fee simple ownership. The same fact is true of the four-room unit. The five-room unit is the smallest individual house that should be built. The six-room house is the best detached individual unit.

8. The working man must pay the price that is necessary for a decent home, and his wage must be sufficient to allow for a decent, economical home.

9. The large volume of money necessary to support a home-building program demands that the money shall come from people who work, and in small sums.

10. The money will be obtained more cheaply from the people than from any other source. The demands from the people

for use of their money are two: safety of investment, and liquid character of investment.

11. Cities grow in proportion to the number of families that are satisfied, and not in proportion to the birth rate. Rapidly growing cities attract young people, because it is youth that is mobile. Therefore it is incumbent upon these cities to provide homes for young people. That is what Bridgeport has done.

12. Unattractive home units will interest only investors with sharp practices and speculative plans in mind. The attractive homes interest both those who are in the employer class and those who are in the employe class. The many visitors to the Bridgeport project are evidence of this fact. Simplicity and good taste are fast taking the place of extraneous frills. The influence of this new style will be made clear to the worker by a slower process than to the employer, but will surely find its way into the popular mind during the next few years.

13. A plan of graduation from the minimum three-room home unit to the permanent

fee simple ownership of the six-room house is desirable, and Bridgeport has built its houses with this in view.

14. Economy demands the three-room home as a temporary dwelling only. The four-room unit should follow the three with the coming of children. The five-room unit should follow the four. The early ownership in home property should be in such form of investment as will admit of easy transfer to a larger and better home as demands require and conditions admit; that is, this progressive ownership should be liquid. It is with the possibility of the development of this progressive type of home ownership in mind that the Bridgeport Housing Company has formulated a program including a large number of group houses of a type new to our city, and, of course, entirely experimental in character.

Such a program is complete when supported by a well-ordered plan of financing and building. Bridgeport's efforts have been made with the studied purpose of providing a plan which has always in mind the increasing demands for accommodations in



EXTERIOR CORNER OF QUADRANGLE OF THE 18-FAMILY GROUP OF APARTMENTS



APARTMENTS FOR 18 FAMILIES, COMFORTABLE, SIMPLE AND INEXPENSIVE

a growing family and a progress of ownership parallel thereto, with the goal of home ownership always in sight. The barest skeleton of such a plan is offered herewith.

The Bridgeport Plan of Progressive Home Ownership

With the purpose of distributing among the residents in these model villages ownership and at the same time of providing an opportunity for proper use of savings systematically made by those dwelling in the model houses, for home purchase, the Housing Company proposes at an early date to invest these savings made by the people in the bonds secured by the property itself, on which an interest rate similar to that paid by building and loan associations, namely, $5\frac{1}{2}$ or 6 per cent, is to be added to the investment; withdrawals in cases of necessity to be arranged for at a penalty of lesser interest rate, approximately 4 per cent, which is the same as that paid by savings banks.

These savings, by this plan, will earn for the systematic saver whose funds are to remain for a period of years, a higher interest

rate than that paid by the savings banks, while those who withdraw their savings would be paid an amount of interest equal to that which they would have earned were their money deposited in savings banks. This part of the plan has the same financial principles as a restricted building and loan association and offers the family during the period of accumulating savings for home purchase the opportunity to live under model conditions in a city village operated by a careful management company, and in a home of proper size to suit the family requirements, these villages being developed with homes of variable number of rooms, from three to five.

When the savings of an individual have reached a sufficient amount to allow the proper initial payment on a house, the Housing Company proposes to arrange the transfer of investment and to establish a proper home building and purchase method, outlined herewith.

To American citizens who are acceptable to the Housing Company, who have accumulated a savings fund of \$1,000, and



A ROW OF FIVE 4-ROOM HOUSES, EACH WITH ITS OWN FRONT AND REAR ENTRANCES

who own a suitable lot of land in Bridgeport, Stratford, or Fairchild, the Housing Company proposes to offer its home building proposition as follows:

1. To supply the balance of the money required for construction contract.
2. To furnish complete working plans and specifications.
3. To arrange all contracts for the building.
4. To supervise the construction.

Payments by the purchaser may be made monthly on the amortization basis, at the office of the company.

The purpose of the first part of the plan is to stimulate thrift and point the way to investment in a progressive home ownership plan, with assurance of safety of investment, liquid enough in form to satisfy the investor, while the family is living in the protected surroundings of the group houses.

The second part of the plan is to aid the thrifty to accomplish under orderly conditions the construction of a home that shall have the protection of guided control of an

operating company whose funds are invested with the purchasers.

The first investment in the case of Bridgeport has already been made and can be divided with no danger of weakening its security. The second part of this investment program is safe from the standpoint of the company, as the risk is taken by the purchaser and is no different from the custom of securing a home a few grades higher up in price. Funds for the second part of the plan can be provided, and will certainly respond to the demand when the demand is strong enough.

This plan is not only sound in its principle of finance, but also in its psychology, and only needs organized approval to be inaugurated. We give the newly married who may have some money saved bad advice if we recommend that they immediately plunge into home-buying before they know what the requirements will be.

Marriage at a younger age without savings, and a thrifty start together in a small home unit, is better for society than the

postponement of marriage till the funds have been saved for a home, desirable but improbable as this saving is with our Americans. The returned soldier is forced to start from the zero money mark. He is necessarily broke and should be starting on his way upward under the stimulus of family life rather than as a roving bachelor waiting to qualify financially.

There is more real saving done by the wife of the working man than by all others put together. This saving proposition in the family of the working man is not co-ordinated by our bankers, our manufacturers, and our real estate operators. The great force of this dormant power was very dramatically demonstrated in Bridgeport by the sale of 404 houses in one night and one afternoon to people who had saved either for a home or for an investment.

This sale is a direct and outstanding contribution to the subject of housing in Bridgeport, and is a clear-cut example of the demand for home ownership when the payments are within wage income and the value is believed to be in the property.

It is our latest endorsement of the amortization principle by the working people.

Every manufacturer in Bridgeport to-day will tell you that the wages of his men is his very greatest concern and that he is extremely anxious that the relation between the wage and the cost of living shall be truly established, and that the wages of the future shall, by this relation, be higher than it has been in the past. It is expected that this margin between the living cost and the income from wages, which is bound to remain at a more favorable figure than before the war, will give a very much larger percentage of our people an opportunity for home ownership.

Organization along these lines is most thoroughly needed, and the patient, painstaking, intimate study of the problem must be undertaken by someone who will sacrifice time and effort and be willing to work for a result that will not be spectacular.

It is just such an effort that is now being carried on quietly through the Building and Loan Associations of Bridgeport.

ACKNOWLEDGMENT.—From a paper delivered before the National Housing Conference, December 10, 1920.



A SINGLE HOUSE IN A ROW. A COSY HOME FOR A FAMILY STARTING IN LIFE

Water Rates in Small Cities and Villages

By John Wilson

Consulting Engineer, Duluth, Minn.

A MUNICIPALITY when operating a water-works system is engaging in a commercial enterprise; and to be successful, it must furnish adequate service at reasonable rates, which must be in proportion to the service rendered and without discrimination.

The service rendered by a water-works plant is of two distinct types: first, it must be ready to furnish water in comparatively large quantities under high pressure for short periods of time for the purpose of extinguishing fires; and second, it must furnish ample quantities of suitable water for domestic purposes under moderate pressure at all times.

It is now generally conceded that all the expense incident to the former should be borne by the village or city at large. It is possibly unfortunate that the method of arriving at the compensation for fire service has generally taken the form of hydrant rental, as the number of fire hydrants has but a remote relation to the value or cost of the service. It has been estimated that 60 to 80 per cent of the cost of water-works plants in cities under 5,000 is incurred by providing reasonable fire protection.

Water Rates for Crosby, Minn.

Two years ago the writer was called on to report on the matter of rates for the village of Crosby, Minn., a problem which involved some unusual and interesting features. Crosby has a population of approximately 3,500, and owes its existence largely to iron mining industries in the immediate vicinity. The water-works plant was installed in 1911 by a private company, and operated by it until two years ago, when it was taken over by the village.

The franchise under which the company operated provided, in case the village wished to acquire title to the plant, that a board of appraisers should be appointed to determine the value and price to be paid. In accordance with this provision, C. T. Harding, of Virginia, was selected by the company, the writer was appointed by the village, and John W. Alvord, of Chicago, was

selected as the third member. The value of the plant, as fixed by the board, was \$75,680.

The plant at that time consisted of twelve ground-water wells 70 to 80 feet deep, electrically driven centrifugal pumps, a 100,000-gallon elevated tank, about 6 miles of distributing mains 4 to 10 inches in diameter, and 34 fire hydrants. Immediately upon taking over the plant the village spent over \$56,000 in extending the distributing mains, and also installed 35 additional fire hydrants.

Determining New Water Rates

The first step in determining what would be a fair schedule of rates was to estimate the proportion of the cost of the plant chargeable to fire protection. It was accordingly estimated that 51.6 per cent of the appraised value and 45.9 per cent of the cost of extensions might justly be charged to fire protection and the remainder charged to commercial service.

The village had 356 consumers, and 155 householders who had asked for connections as soon as the extensions could be completed. The question naturally arose as to who should install the meters and lay the connection from the main to the curb box.

The writer suggested that the village assume the cost of these two items, inasmuch as the number of consumers was small compared with the amount of distributing main; that many of the householders were men of limited means, who would be tempted to carry water rather than connect with the mains were they required to bear all the expense; and, furthermore, one of the principal needs of the water department was paying consumers. It was also suggested that, in consideration of the bearing of this expense by this village, all consumers should pay a service charge sufficient to cover the interest on the necessary investment and depreciation.

In support of these suggestions, the following authorities were quoted.

In the case of Samuel M. Gillmore vs. Hackensack Water Company, the New Jer-

sey Public Utility Commission ruled as follows:

"The Board concludes that the Hackensack Water Company should take upon itself the burden of maintaining all such connections as lie within the public streets up to and including the stop-cock.

"The practice of the company, requiring the consumer to pay for the installation of service pipe within the public streets and the stop-cock, is disapproved as an improper and unreasonable charge.

"Dated December 7, 1915."

A similar ruling by the Wisconsin Railroad Commission was as follows:

"The question as to who should own meters appears to be settled. The only point to be decided here is whether or not services are a part of the facilities which the utility is expected to furnish. The logical conclusion seems to be that the utility should install and own services to the curb line. The utility, and not the consumer, has the right to occupy the streets, and all pipes laid in the streets should be the property of the utility, and we believe should be put in by the utility. The business of the utility is to deliver its product to the premises of the consumer. If the utility should own the mains through which water is carried to various sections of the city, it seems equally true that it should own all parts of the distribution system as far as the consumer's premises. The service pipe from main to curb is as much a part of the utility's distribution system as is the main itself. Both parts of the equipment have the same purposes—the delivery of water to the consumer's premises."

The California Railway Commission reached the same conclusion (2 Cal. R. C. R., page 989), in which the Commission said:

"That it is the duty of a water company to supply service connections up to the property line, and meters, where meters are used, without direct expense to the consumer, seems clear both on principle and on authority. Such requirement seems entirely reasonable. The service pipe up to the property line and the meters, where used, are as necessary in the performance of the water company's duty to the public as its reservoirs, wells or mains. The consumer has no right to dig up the streets to lay a service pipe. That right belongs to the water company alone. It seems unreasonable to ask that the consumer should pay for service pipes and meters which are a part of the water company's system, which the consumer has no legal right to install and which are under the complete control of the water company."

The service rates suggested, which would be a regular monthly charge, in addition to regular meter rates, were as follows:

	Per month
$\frac{5}{8}$ -inch meter.....	\$.40
$\frac{3}{4}$ " ".....	.75
1 " ".....	1.25
$1\frac{1}{4}$ " ".....	1.80
$1\frac{1}{2}$ " ".....	2.50
2 " ".....	4.00
$2\frac{1}{4}$ " ".....	6.00
3 " ".....	8.00
4 " ".....	12.00

One advantage of a service charge is that it tends to regulate the department's income and thus aids in meeting current expenses, and graduating the charge according to the size of meter and connection protects the department against demands by consumers for much larger fixtures than are necessary.

As closely as could be ascertained, the yearly consumption of water would be distributed as follows:

	Cubic feet
Measured by $\frac{5}{8}$ -inch meters.....	1,440,000
Measured by larger meters.....	188,520
Passing meter without registry.....	50,000
Street sprinkling.....	200,000
Drinking fountains.....	180,000
Flushing sewers, etc.....	30,000
Flushing trenches.....	10,000
Testing meters.....	600
Use in extinguishing fires.....	32,400
Total.....	2,221,520

It is clear that the first three items should be paid for by the water consumer, the last one charged to fire protection, and the remainder to the village at large.

Very unfortunately, no means had been provided at the plant to determine the amount of water pumped. It was therefore assumed that the above would constitute about 60 per cent of the water actually pumped and that 40 per cent would be unaccounted for.

The total annual expense for everything connected with the department was about as follows:

Interest on bonds \$130,000 at 6%.....	\$ 7,800.00
Interest on other indebtedness \$15,000 at 6%.....	900.00
Clerk's salary, charge to Water Department.....	960.00
Superintendent's salary.....	1,800.00
Labor.....	600.00
Office supplies, postage, etc.....	500.00
Fuel.....	30.00
Meter repairs.....	100.00
Maintenance, supplies and depreciation....	1,500.00
Electric current.....	612.50
Insurance.....	30.00
Telephone.....	25.00
Total.....	\$14,857.50

It is at once apparent that a rate for water which would yield a fair return on an investment such as incurred by these extensions, would be unreasonable, and at the same time it would not be just or fair to place this additional expense on such consumers as the village already had.

The village was under moral obligations at least to contribute something to the re-

lief of parties who had been deprived of well water. It was also engaging in a commercial enterprise, and should expect, the same as in any other business, to do so for a time at a financial loss.

It was, therefore, estimated that a reasonable deficit over a fair return on these extensions would be \$1,700 per year, which should be included in the proportion of the expense borne by the village at large.

From the foregoing data the rates which should be put into effect and the income to the water department would be as follows:

Service Charge			
400-	5/8-inch meters at	40c. per month	\$1,920.00
2-1 1/4	" " "	\$1.80 " "	43.20
1-1 1/2	" " "	2.50 " "	30.00
1-2 1/2	" " "	6.00 " "	72.00
1-3	" " "	8.00 " "	96.00
<hr/>			
Total from service charge.....\$2,161.20			
1,628,520 cubic feet of water at 25c. per 100 cubic feet, \$4,071.30, making a total income from private consumers of \$6,232.50, and a total income from all sources of \$14,857.50.			
Hydrant rental, 79 hydrants at \$75.00.....\$5,925.00			
Deficiency on fair return on extension.....1,700.00			
Water used by village at 18c., 100 cubic feet 1,000.00			
<hr/>			
Total due from village.....\$8,625.00			

In this way the village would pay 58 per cent of the total annual expense, and the water consumers 42 per cent.

The Wisconsin Commission ruled, in the case of Ashland, Wis., that the city should pay 54.5 per cent of all fixed charges; and in the case of Ripon, Wis., that the city should pay 75 per cent of all fixed charges; it therefore seems that the distribution at Crosby would not be unreasonable.

Such items as clerk's salary were all charged to domestic service, while the fire service was charged with its share of interest on bonds, maintenance of fire hydrants, etc.

The case of Crosby will illustrate fairly well some of the principles of arriving at proper rates in a given case. Let us briefly consider the rates now in effect throughout Minnesota.

The following figures are necessarily not

exact, but they are taken from about 140 towns and are, therefore, reasonably representative.

Fifty-seven per cent of the water plants in the state receive nothing whatever from the municipality in the way of hydrant rental or payment for fire protection. Where hydrant rental is paid, it ranges all the way from \$4 per year per hydrant to \$140, the average being about \$35.

Seventy-eight per cent of the towns pay nothing for water used for public purposes, such as street sprinkling, while of those who do pay, 69 per cent do so on a flat rate basis, without regard to the amount of water used.

In commercial service, about 44 per cent are on a strict meter basis, 36 per cent on a combined meter and flat rate basis, and 20 per cent are on a flat rate.

The rates in most cases are on a sliding scale, decreasing as the amount of water used increases. The most extreme case is a town of a little over 3,000, where they have 21 different rates for water and 20 different rates of discount for payment of bills when they become due.

In most cases the revenue derived from commercial service is not sufficient to cover the department's needs, and certificates of indebtedness are issued. These certificates bear 6 per cent interest, and in many cases can only be disposed of upon a discount of about 10 per cent. Paper of this kind is allowed to accumulate until a special levy in taxation is made or bonds are issued for paying off the indebtedness.

The whole procedure is an expensive and extravagant way of doing business. In consideration of the present state of the money market, many towns would do well to revise their water rates and place their departments on a cash basis.

ACKNOWLEDGMENT.—From a paper read before the Minnesota Section of the American Water Works Association.

Wireless Telephones for Fire and Police Departments

Chicago will be the first city to use wireless telephony in protecting the lives and property of its citizens from destructive elements and predatory individuals. The system is so simple that any person who can talk can send a message and anyone who can hear can receive it. The initial in-

stallation, which is largely experimental, will be made in two fire engine houses, two police stations, two fire-boats, one fire alarm station, and two gun squads. The results of the experiment will be closely followed to determine the practicability of this device in fire and police protective work.

Street Renumbering in Utica, N. Y.

By George D. Shay

City Clerk, Utica, N. Y.

IN many of the older American cities the numbering of the city streets has been of a more or less haphazard nature, usually beginning at the hub of the local universe and proceeding from 1, on past all streets without a break, until somewhere in the outskirts it reaches 200 or 300 or higher. This leaves all the intermediate numbers largely a matter of guesswork, except to the residents of the locality immediately concerned.

This was particularly true of Utica, N. Y., whose local hub was Genesee and Bleecker

This condition of affairs was not helped by the fact that in the past in complying with ordinances of common councils directing renumbering, a few streets here and there had been renumbered on an approximation of the block system. Thus, a stranger having, let us say, a number 220 Mary Street, would conclude that 230 Elizabeth Street, just north, would be in the same block; he would start to walk it and would find that number 230 was about a mile and a half to the east, not being numbered on the block system. It was said

MAP FOR RENUMBERING WEST UTICA

Adopted by the Common Council, February 2, 1916



SUGGESTION:—See if you can renumber the order of the streets shown in heavy type.

BLOCK NUMBERS ON EAST AND WEST STREETS

All streets beginning at Genesee St. are 100 ft. in a block.

300	West of Broadway
500	State St.
700	Brown St., Washington St., Fay St., or Franklin St.
900	St. Joseph St., Wiley St., or Summit Ave.
1100	Shelby St., or else length between Ave. Clinton St. or West Ave.
1300	Myron St., Cornell and City St.
1400	Intersection of Court St. and Whiteland St.
1600	Wheat Ave. and Central Ave.
2700	Dewar Ave.

BLOCK NUMBERS ON NORTH AND SOUTH STREETS

100	South of Whiteland St. from Union St. to Broadway
400	Erie Canal to Lafayette St.
500	Lafayette St., same as Bleecker St.
600	Columbiad
700	Court St., West Union St., Hamilton St. and Orchard St.
900	Court St., entire length
1000	Whiteland St., West St. and Gray Ave.
1400	Noyes St. and Hickory St.
1600	Lawrence St. and Linden St. and includes three blocks
1800	Shaw St. to Pleasant St.
1700	Pleasant St., same as to East City
1000	Grand Ave.

NOTE:—North and south streets north of Whiteland St., retain their old numbers as does also the block of streets beginning at Union St.

In order to be in West City numbers are nearly opposite the main block number in East City. It was found necessary to combine several blocks into the new block number as shown on map.

THIS MAP WAS DISTRIBUTED BROADCAST WHEN THE RENUMBERING OF HOUSES IN UTICA WAS COMPLETED

Streets, the former being the principal street and a diagonal one. All streets intersecting this diagonal began their numeration there at zero, the numbers of each street therefore starting at a point considerably to the east or west of the starting point of the next street north or south. The result of this was that the numbers on any two east-and-west-streets were entirely unlike between the same two north-and-south streets. There was endless confusion as a result, for, without a rational basis, one man's offhand guess was as good as another's.

that it would need the services of a detective to find some of the street numbers.

Getting the New System in Working Order

When James D. Smith became Mayor in 1914, he recommended the renumbering of the whole city on the block system, and the City Engineer, Joseph Kemper, was directed to devise a practicable plan for the work. With Genesee Street as a diagonal bisector of the city, and many old irregular-shaped areas to contend with, it was by no means an easy task to bring about such an order of numbers on both sides of

the city that, knowing a few fundamentals of the system, locations could be readily determined. It was necessary in some cases to include two or three short blocks in the same hundred, so as to bring a smaller section into harmony with a larger governing one. The difficulty caused by the diagonal main street was overcome in a somewhat similar manner.

Following the Mayor's recommendation, the work was ordered by the Council in February, 1914, and one-half of the city was renumbered before the publication of the city directory in June of that year, the work being completed the following year. The ordinance directed the City Engineer to prepare a plan and to renumber the entire city. Mr. Kemper realized, of course, that no ordinance of the Council would give his men the right to remove old numbers from houses and replace them with new ones, so some diplomacy was necessary. After numerous efforts, the public utility companies, the big department stores, the Post Office, the directory publishing company and others who had frequent occasion to use city numbers, were prevailed upon to accept the new numbers as fast as the City Engineer could fix them on houses, and information was given to the various companies daily so that a man no sooner had a new number than he began to receive mail directed to that address.

When a householder was approached by the renumbering party with a request for permission to change the number, and was refused, the chief of the party would express his regret, saying he was sorry, because the Post Office, the gas and electric company, the water company and others would use the new number whether it was on his house or not. The reply was invariably effective in making the reluctant

householder see the light.

The objections to renumbering are usually based on the fear of confusion in receiving mail, and the necessary change in printed stationery. In one case an old soldier objected to changing his old number, 62, because that was the year he went to war.

A careful record of all old and new numbers was kept in the City Engineer's office, by streets, in alphabetical order, so that the old or the new number of any renumbered house could be given without delay. It was early recognized that the only way to make the householder use the new number on his house was for the city to supply and place the numbers, which was done. The numbers were nickelplated and about two inches high. While the work was one of difficulty, the general public approved of it after its completion.

It had been thought of years ago and mentioned in many reports and messages in the hope that something could bring it about, but work on the city map and in the streets was the only thing that accomplished it.

The advantages of the block system are many, particularly to the business houses. Knowing, let us say that all numbers in the 1400 block lie between the same two cross-streets, deliveries can be systematized, much time can be saved and the work of distribution so simplified that it can be done by a boy, where formerly it took a Sherlock Holmes.

In order to aid the public in learning the new system, the city map, with the new numbers of blocks shown thereon, was reproduced on a small scale and distributed free from the City Engineer's office, and some business houses published, as an advertisement, cards bearing the order of the streets with their new block numbers.

Detroit Votes for Municipal Cement Plant

A charter amendment providing for the acquisition of a municipal cement plant and municipal gravel pits has been approved by the voters of Detroit. The amendment also permits the Commissioner of Public Works, with the approval of the Common Council, to establish and operate plants for the manufacture of common brick, vitrified crocks, and creosote blocks. It is estimated

that a municipal cement plant and gravel pit would save the city nearly half a million dollars a year; as the city has a great amount of work to be done, including that on the municipal street railways, sewers and pavements. The Belle Isle Bridge project and public buildings contemplated or under construction will also occasion a heavy demand for cement and concrete.

A Specific Method for Determining Street Lighting Costs

New York's Public Service Commission's Decision in Elmira Case Furnishes a Good Standard Method

By F. W. Ballard

F. W. Ballard & Company, Engineers, Cleveland, Ohio

THE decision in the Elmira electric rate case, by the Public Service Commission of the Second District of New York, on March 1, 1921, is one of the most important cases with which the writer has been connected. The case was quite complicated, and a large number of questions were decided in such a way that an analysis is valuable for those having to do with work of this character.

The case was heard by Joseph A. Kellogg, Commissioner, who wrote the decision and is entitled to special commendation for his contribution to the records which we have to guide us on valuation and rate case work. This decision stands forth prominently as furnishing definite authority for methods of treating a large number of questions bearing on utility problems. The method of handling street lighting costs and separating them from other elements, is complete and furnishes a definite basis for fixing rates for this service.

While this paper will be limited to an analysis of that part of the decision relating to street lighting costs, there are other features which are of considerable interest and are well worth consideration. Some of these other features are as follows: the separation of investment and operating costs, as between two departments which make a joint use of the same equipment, such as a power station; the treatment of the question of allowance for new equipment under construction at the time of the valuation; the allowance of a coal differential in power rates; the question as to the deduction of depreciation; and the allowances for working capital, going concern value, etc.

Scope of Inquiry

The scope of the inquiry in this case included the cost for municipal street lighting, the original contract having expired in 1918 and the parties not being able to agree upon a subsequent contract. The company

had filed a tariff after the expiration of the contract and had claimed the right to collect revenues on the basis of that tariff for street lighting.

It was claimed by the city, and not disputed by the company, that the street lighting system under the old contract, which was being maintained and operated at the present time, was out-of-date and obsolete, and that a new and more up-to-date method of street lighting should be installed.

The city had prepared specifications and secured bids upon the basis of a more modern system of street lighting. The company had made a bid upon these specifications, but the bid had been rejected and the question of the proper rates to be charged for this service was left to be decided by the Commission when fixing rates for service by the utility.

The Commission's decision in regard to this matter was as follows:

"It would seem to be the proper outcome of this controversy in this aspect to make provision for the installation of the improvements suggested, and that a lighting system in accordance with the specifications submitted should be installed, and reasonable compensation for such installation and furnishing of current thereafter should be allowed to the company, by rates to be fixed here."

The specifications called for 305 600-candle-power, nitrogen-filled Mazda lamps at various locations for street lighting, and 821 100-candle-power Mazda lamps at various locations for street lighting, and 365 250-candle-power lamps to be placed upon boulevard standard posts owned by the city. It was held by the Commission that it seemed proper to install the lamps of the quality and cost described by the city. Upon this basis the following table was presented in the decision as the findings of the Commission on the various items of cost which would enter into the consequent charges for all-night service:

	600 c.p.	100 c.p.	250 c.p.
Lamp fixture complete....	\$ 22.70	\$14.10	\$24.50
Labor, erecting and miscellaneous material	5.00	5.00	5.00
Lamp	3.45	.83	1.62
Station equipment	18.67	5.21	9.67
Pole line equipment (new) ....	....	....	43.27
Total new equipment..	49.82	25.14	84.06
Total 11¼% overheads...	5.62	2.83	9.46
	\$ 55.44	\$27.97	\$93.52
Pole line equipment (existing)	48.27	48.27	....
Total	\$103.71	\$76.24	\$93.52
Operating Costs			
Energy *	\$ 26.80	\$ 7.38	\$13.70
Repairs to system	2.00	2.00	2.00
Replacement lamps	13.80	3.32	6.48
Refractor	2.55	1.28	3.55
Globe	1.50	....	....
Cleaning and making replacement	2.00	2.00	4.00
	\$ 48.65	\$15.98	\$29.73
Fixed Costs			
Taxes, 3.24%, return 8%, depreciation 5% (total 16.24%)	\$ 16.85	\$12.38	\$15.15
Amortization new equipment—10 years' period.	4.98	2.51	8.41
	\$ 70.48	\$30.87	\$53.29

* (Note: Energy charges are based on 1919 coal prices, as shown in annual report, plus an allowance of \$1.00 per net ton for increased freight rate and war tax.)

Reducing these figures to round numbers, the order based on the decision authorizes the rate to be charged for various lamps per annum as follows:

For the 600-c.p. lamps.....	\$70.50
For the 100-c.p. lamps.....	30.75
For the 250-c.p. (boulevard).....	53.25

Of the revenue to be obtained by the company for municipal street lighting, the sum of \$19,180 is the amount derived from electrical energy furnished by the system. This is shown by the following computation:

Energy Computations	
Approximate value generating plant.....	\$1,200,000.00
Conference Report (Brief 51)	
Return	8%
Depreciation	3%
Taxes	3.24%
	14.24%
Fixed charges	\$170,880.00
Kw. hrs. sold 1919.....	35,491,000
Fixed charges per kw. hr.....	\$.00482
Total operating expenses per kw. hr. sold or used.....	\$.01288
From which is deducted	
Commercial expense .....	.00062
Distribution expense .....	.00065
Utilization expense .....	.00030
	.01181
Fixed charges to be added.....	.00482

Total energy charge per kw. hr.....	\$.01613
Increase in energy charge due to increased freight rates.....	.00143
	\$.01756

Energy charge all night	
600 c.p. = .381 x 4,000 x .01756 =	\$26.76
250 c.p. = .195 x 4,000 x .01756 =	13.70
100 c.p. = .105 x 4,000 x .01756 =	7.38
Assumed energy consumption per lamp based on city's estimate	
600 c.p. = 381 watts	
250 c.p. = 195 watts	
100 c.p. = 105 watts	
305-600 c.p. at \$26.76 =	\$ 8,161.80
821-100 c.p. at 7.38 =	6,068.98
363-250 c.p. at 13.70 =	4,953.10

Total energy cost.....\$19,183.88

It will be noted in figuring the cost of energy consumed in the street lighting system that the entire cost at the switchboard of the generating station was used. This included a return on the investment in the power station of 8 per cent, an allowance for depreciation of the investment in the power station, and taxes—making the total fixed charges, to which were added the operating expenses of the station only.

In addition to the energy charge for current used for operating the street lighting system, all expenses for repairs, etc., incident to the operation of the system were included and also the fixed costs, including taxes, depreciation and return on the investment for the entire equipment used for street lighting service outside of the power station. While 3 per cent was the amount allowed for depreciation of the power station, 5 per cent was the amount allowed on all equipment used in the street lighting system outside the power station. In addition to this, there was also an annual allowance of 10 per cent of the cost of all the new equipment which it will be necessary to install to put in an up-to-date system. No allowance was made for amortization of the old equipment which had been in use, the assumption being that this had been amortized under the old contract.

The method followed for determining street lighting costs upon which rates for this service should be based has thus been set up in such a complete manner as to furnish a method easily followed for fixing rates for similar service in other communities.

The question of safety alone would suffice to warrant the importance now placed on adequate and plentiful street illumination. In Cleveland, accidents directly chargeable to lack of daylight, that is, those customarily occurring after dark, increased some 37½ per cent when the lighting was cut down. In the metropolitan district of New York, the number of people killed at night increased 73 per cent, and the number of injured 21 per cent, from 1913 to 1915. Adequate and proper lighting is highly important.

New Viaduct Adds Business Block to Knoxville, Tenn.

By Carlos C. Campbell

Publicity Secretary, Knoxville Board of Commerce

TRANSFORMING a business block from a row of shooting galleries, cheap photograph shops and second-hand stores to a block of first-class retail houses, is the feat accomplished by the new reinforced concrete viaduct recently completed in Knoxville, Tenn. This new viaduct also provides a more direct connection between the main business section of

The new viaduct ran just a few feet below the roofs of the one-story buildings. Eight of these old structures have already been razed, and new, attractive buildings, three and more stories high, are taking their places. Other buildings are planned, and the entire block will soon be filled with modern structures. The buildings on the east side of the street were three, four and five



THE GAY STREET VIADUCT, KNOXVILLE, TENN., THROUGH ITS SIMPLICITY AND BEAUTY ADDS MUCH TO THE BUSINESS DISTRICT

the city and the new business district now being developed north of the Southern Railway lines, and facilitates the handling of traffic over Gay Street, the leading business street of the city.

The new concrete viaduct replaces the former steel truss bridge across the railroad tracks, which ended at Jackson Avenue with a $6\frac{1}{2}$ per cent grade. The new structure passes over Jackson Avenue and extends to Vine Avenue on a grade of only 1 per cent. Because of the former excessive grade, desirable retail stores had been kept out of that block of Gay Street.

The old buildings on the west side of this block were only one and two stories high.

stories high. These were converted into valuable retail buildings by changing the floor levels to that of the new street level. The extension of the viaduct and the elimination of the steep grade has added another good business block and has helped to relieve the congestion.

The viaduct is of the girder type, with spans varying in length from 19 to 38 feet in order to accommodate the railroad track layout. The bents supporting the spans consist of five columns, resting on heavy reinforced concrete footings extending the full width of the bridge.

The foundations of the columns across the railroad yards rest directly on hard natural

clay. Those on the south end, near Jackson Avenue, as well as the foundations of the Jackson Avenue and Gay Street approaches, are supported by reinforced concrete piles. The pile foundations were necessary because the site was formerly a swamp. Pile lengths vary from 20 to 40 feet, and the thickness varies from an average of 18 inches at the top to 6 inches at the bottom. The total number of piles driven was 327, and the time required was six weeks. This portion of the work was executed by the Raymond Concrete Pile Company, of New York, owners of the Raymond patents.

The Gay Street approach consists of a fill of sand and gravel, made between two concrete retaining walls of the buttress type, which were built directly on the curb line of the old street. This fill contains 8,500 cubic yards of sand and gravel, and is covered by an 8-inch base of concrete, on which asphalt paving is laid. This fill was made by dumping the sand and gravel from side-dump cars on the street railway track and washing the material into place by a 4-inch hose. The car tracks were raised one foot at a time as the filling progressed, and street railway traffic was not interrupted at any time.

The Viaduct is Well Lighted

The lighting system of the viaduct is unusual, in that the concrete light standards supporting the 200-watt lamps are entirely outside the sidewalks, leaving the curb lines entirely unobstructed. These light standards were especially designed for this work, and are made of pink granite. Ducts carrying the lighting wires and the conduits of two telephone companies, the Western Union Telegraph Company, and the local gas company, are out of sight below the floor of the viaduct. All overhead wires, excepting trolley wires, crossing the railroad at this point, have been removed.

The construction of this viaduct was financed by a bond issue which was passed favorably upon by the taxpayers of Knoxville in a special election. The total cost of the viaduct was a little more than \$390,300. The new structure is truly a Knoxville-made product. The design was made by W. B. Crenshaw, assisted by H. M. Perrin, both Knoxville engineers. The contract was awarded to M. C. Monday, a widely-known contractor of Knoxville, and the construction was carried on under the direction of L. W. Frierson, bridge engineer.

Method of Street Repair in Chickasha

By John C. Milliken
City Engineer, Chickasha, Okla.

An easy, economical and quite permanent method of patch-work repairing concrete-base asphalt-surface pavement has been devised by D. W. Beets, Street Commissioner of Chickasha, Okla.

The preparation plant consists of two vats 8 feet long, 4 feet wide and 1 foot deep in the center, with a V-shaped bottom and a small flange iron on the edge to support the weight of the vat. These vats are built on furnaces and placed 2 feet apart, so that the materials may be moved from one to the other. One vat is used for drying the materials, the other for mixing.

The material consists of Joplin chat, clean, sharp sand, and No. 54 paving asphalt. They are mixed 3 parts of chat, 2 parts of sand, and enough asphalt to make a plastic mixture, which is 16 No. 2 shovelfuls of aggregate to 1 gallon of asphalt.

The sand and chat are mixed, placed in a vat and thoroughly dried. When dry, the aggregate and asphalt, which have been brought to boiling in a heating pot, are placed in the other vat and thoroughly mixed with shovels. The mixture is then transferred to the truck and delivered at once to the place to be repaired.

The sides of the worn place to be patched are cut perpendicular, brushed and thoroughly cleaned before the mix is applied. The mix is then applied and thoroughly tamped with hot tampers until the hole is brought up to the level of the surface. Then a half-and-half cement and sand mix is applied over the patch to fill up the voids. Traffic is withheld for two hours after the patch is completed. Patch-work laid in this manner has lasted for about two years and is still giving good satisfaction.

Garbage Collection in Buffalo, N. Y.

By Lloyd S. Graham

SINCE the beginning of history, the difficulty of garbage collection and disposal has been a vexing problem to municipalities, large and small. Half-way measures would not do; that was taught in the very rudiments of sanitation and in the development of medical science in measures to put down epidemics. Methods might differ widely, but real results there must be.

This applies to small cities as well as large ones. Too often the smaller munic-

great offense to the comfort of Buffalo citizens. It is also handled at something like a profit.

It is only during the last few months that the system has been completed so that it is running steadily and smoothly. There are so many complications and conditions in connection with its metamorphosis during the last year that it is impossible to give cost figures with any degree of accuracy or fairness. Suffice it to say that the cost of the system, complete, is considerably less



COLLECTING GARBAGE IN THE RESIDENTIAL SECTION OF BUFFALO, N. Y.
Garbage, ash and rubbish wagons trail each other so that the same men load each group

icipalities are inclined to let such matters go the easiest way until a disaster causes an investigation and some change in system or policy. There is still much to be learned about municipal garbage collection and disposal, but Buffalo has gone a long distance in solving its own problem at least.

Buffalo has a population of more than half a million, and some unusual complexities in transportation as well as in the way in which the city is laid out. But through the intimate knowledge of conditions and the forethought of William F. Schwartz, Commissioner of Streets, a system has been developed whereby the garbage is collected and disposed of quickly, easily and without

than it has been in nearly a score of years, although the population has increased rapidly during the same period. After all, so far as the individual citizen is concerned, perhaps the cost is of less importance than the fact that the newly developed system gives "service," service especially in collection. While it is too early to give accurate costs, it is not too early to know that the system gives satisfaction.

The pay-roll for the collection of refuse and ashes as well as garbage approximates 500 men. The bulk of it is composed of about 300 "lifters and rollers" and 160 drivers. The city is divided into nineteen districts, with a foreman and an assistant

foreman in each district. From May to November collections are made twice a week, and once a week the rest of the year, except in the business section, where collections are made once each day except Sundays.

Convenience and Economy

One of the simple, economical features of the system is that the three wagons for papers and refuse, ashes, and garbage move together, with the same lifters and rollers serving all three at one time. While this may necessitate the use of more equipment, it is an economical step nevertheless, because it saves an immense amount of time in the course of a year by sending a gang of men over the ground once instead of three separate times. It is also more agreeable to the people, since in this way each street is mussed up with the sights and smells connected with garbage collection one day a week, speaking of winter, instead of every other day.

Another convenient feature of the system, which few other cities have, is the collecting of the ashes, garbage and refuse from the rear of the houses. Household-ers do not have to arise a little earlier in the morning to carry their garbage, ashes and refuse out to the curb or hire someone to do it for them. The "rollers" go along ahead of the wagons and perform that service. All Mr. Citizen has to do is to put anything he desires collected outside the house in the rear on certain regularly specified days of each week.

This service may cost the city a trifle more, but there are several advantages, and doubtless the extra cost is more than covered by other efficiency schemes in the department.

The wagons used in collection are horse-drawn, and the garbage wagons are rubber-tired and water-tight. They were constructed to be used with teams in collection and also as trailers in motor-truck trains. Each garbage truck has a capacity of 5 tons and a cubic capacity of $5\frac{1}{2}$ yards.

The Equipment

When loaded, the garbage trucks are taken to a central barn, of which there are two in the city, one for the east and the other for the west side. At this central barn, as fast as three or four arrive they are hooked up together and hauled by a tractor

truck to the swine-feeding farm under private management, about $3\frac{1}{2}$ miles from the city limits.

In the service of the Department of Streets are 21 tractor trucks, which were especially constructed by the Pierce-Arrow Motor Car Company, so that they may be used for a variety of purposes besides hauling garbage. They may be used as snow fighters with plow apparatus, and also, in season, with 5-ton water-tanks for flushing streets.

Ordinary repairs on motors, trailers and wagons are now being made by city employes, but the final feature in completion of the system will be a city garage, construction of which is just being finished. It will be open for operation this spring. Trucks will be kept there, and all kinds of machinery for repairs, so that there will be continuous service with a minimum of "dead" hours for trucks or other equipment.

In the collection service, the day shift goes to work at 7 o'clock in the morning. All of the down-town garbage collection is done at night, and the shift for that service goes to work at 5 o'clock in the afternoon and finishes about 1 o'clock in the morning.

A Sanitary Service

Aside from the collection system itself, one of the measures taken to conserve the health of the city is an ordinance which prohibits the private collection of garbage within the city limits. Previous to the development of the present system there was continual trouble with farmers collecting garbage from restaurant proprietors and others. While there was no particular harm in that in itself, the method of collection was so unsanitary in many cases as to be a menace to the public health.

As the collection is conducted at present, it is as nearly sanitary as possible. As soon as the wagons are loaded they are covered with a canvas tarpaulin, and they are not uncovered again until they reach the feeding farm. As stated before, they are water-tight. Gradually the private garbage collectors are being eliminated.

So far as the city is actually concerned, its service is completed when the truck tractor chauffeur drives into the feeding shed at the piggery and pulls the levers which automatically turn the trailer bodies upon their sides and dump them. With that its obligation ends.



GARBAGE TRAIN TURNING CORNER ON WAY TO HOG FARM

The Financial Advantage

On the other hand, the city has a subsequent financial interest in the matter. For several years until about a year and a half ago, the city of Buffalo had a contract with a feeding company by which the Department of Streets collected and delivered the garbage to the farm just as it does now and the city paid the company from \$1.00 to \$1.25 a ton, besides extra sums at various times, to accept and dispose of the garbage.

The company held the city to a certain minimum amount, and one year when only 19,000 tons could be delivered, the city had to pay a fee of \$6,000 for not delivering the minimum amount. So it was that from July 18, 1913, to September 1, 1919, Buffalo paid this garbage disposal company a total of \$176,930.33 to take care of city garbage after collection and delivery.

At the new feeding farm, which is under entirely different management and conducted by different methods, the first calendar year of operation under the new system resulted in the crediting of \$16,682 to the city, the latter still doing the collection and delivery.

The feeding farm is under a five-year contract with the city by which the city is to receive no less than 50 cents a ton for garbage. The price is on a sliding scale and

is based upon the average price per pound of live hogs each month on the Chicago market.

Take the month of November, 1920, as an example: Each day of the month, the live hogs' quotation on the Chicago market was tabulated from the *American Drovers' Journal*. On November 1 the price was \$.136 per pound. During the month the price reached the high mark of \$.145 per pound, and it sank back to \$.10 on November 24. The month closed at \$.106. All of the daily quotations for the month were averaged, and \$.1258 per pound was the result used.

The rate per pound is multiplied by the arbitrary number 6, which is used when the yearly amount of garbage delivered is less than 30,000 tons. That gives the result of \$.7549. During November the city delivered 1,678.072 gross tons of garbage, so that amount was multiplied by \$.7549, the basic rate per ton, whereby it appears that Buffalo is to receive \$1,266.78 for the November garbage, as a minimum.

If at the end of the year, it appears that more than 30,000 tons has been delivered during the twelve months, the arbitrary multiplier will be 7, up to 40,000 tons, and over that, 8. During the first calendar year of the new system, the city delivered 18,000 tons to the Huff feeding farm.

Canadian Cities Try Proportional Representation

By George H. Hallett, Jr.

Assistant Secretary of the Proportional Representation League

IN 1916 the first Canadian city, Calgary, Alberta, adopted the Hare system of proportional representation. In less than five years since Calgary adopted it, it has been adopted for municipal elections by every city of western Canada with more than 20,000 inhabitants (according to latest available figures), with the single exception of Edmonton.

The list of Canadian municipalities using P. R. now stands as follows, the first column giving population, and the second the date of adoption of P. R.:

Winnipeg, Manitoba	163,000	1920
Vancouver, British Columbia	114,220	1920
Victoria, British Columbia	60,000	1920
Calgary, Alberta	56,514	1916
Regina, Saskatchewan	26,127	1920
Saskatoon, Saskatchewan	21,048	1920
Moose Jaw, Saskatchewan	16,934	1920
North Battleford, Saskatchewan	3,145	1920
Port Coquitlam, British Columbia	2,300	1917
West Vancouver, British Columbia .....	.....	1917
Mission, British Columbia	100	1917

* These figures are the latest available. For Manitoba, Alberta, and Saskatchewan they are of the year 1916.

The Winnipeg Election

The three largest of these cities have held municipal elections under P. R. for the first time.

The background of the Winnipeg election was an interesting one. It will be remembered that in May, 1919, Winnipeg was the scene of a general strike which left the city divided into two bitterly hostile camps.

The elections of December, 1913, were fought entirely on the issue of labor and anti-labor, and the result was a deadlock, seven aldermen being elected by each side. This awkward state of affairs proved a blessing in disguise, for it called everyone's attention in a dramatic manner to the unfair basis on which elections had been held. Not only was the minority in each ward sure to be without representation, but the ward division itself was most unfair; one ward had as many voters as three others put together. There was manifestly no likelihood that a board of aldermen elected on such a basis would be a truly representative one, and the demand for reform became almost universal. Labor demanded election

at large with proportional representation. Others contended that a more equitable ward-division would be sufficient. A compromise was finally agreed on; the city was divided into three wards of equal voting strength, and each ward was assigned six aldermen, three to be elected by P. R. each year for a two-year term.

The first municipal P. R. election in Winnipeg was held early in December, 1920. There were two parties in the field, the "Labor Party" and the "Citizens' Party." A number of independents also ran, but none of them had any substantial amount of support. In Ward 2, the strong Labor minority elected one alderman while the Citizens' majority elected two. In Ward 3, where Labor was in the majority, Labor elected two and the Citizens' Party one. In Ward 1 the Labor minority, with about 20 per cent of the votes, was just too small to deserve to elect one of the ward's three aldermen. If proportional representation had been applied at large, Labor would have elected four instead of three out of nine.

The Elections in Vancouver and Victoria

In Vancouver and Victoria the first P. R. elections were held January 13, 1921. They appear to have been, in the words of E. S. Woodward, President of the Victoria Trades and Labor Council, a "complete success." To be sure, there was some dissatisfaction expressed in both cities by persons who did not yet understand the new system, but there appears to be no doubt that the voters found the new method of voting easy, and that it resulted in the election of city councils truly representative of the entire electorate.

That the voting proved easy is shown by the small number of spoiled ballots. In Victoria less than five per cent of the ballots were rejected for all causes, and in Vancouver less than three per cent—less than in some recent elections under the ward system. This in spite of the fact that P. R. had never before been used by a vast majority of those who voted.

The Value of Accurate City Maps

By R. W. Rigsby
City Manager, Bristol, Va.

IN company with many cities of similar size and even a great deal larger, Bristol, Va., had no continuity of policy or adequate method relative to planning and recording public works up to the inauguration of the present city government. The duties of the Engineer's office for a great many years had been performed by a part-time engineer. He was called upon by the Council from time to time to perform special services in connection with city work pertaining strictly to engineering. The Council assumed the role of final arbiter in all questions of public works construction and layout, both as to plans and execution. This meant that a purely legislative body was attempting to administer a technical side of city development, even though no individual

of this body had a special knowledge of the subject, and resulted in the following serious handicaps to the intelligent administration of the city's physical development:

First, the sewer and water lines became merely a patch-work system without any well-drawn plans for future extension, and were not adequately constructed in all cases to properly take care of the city's needs.

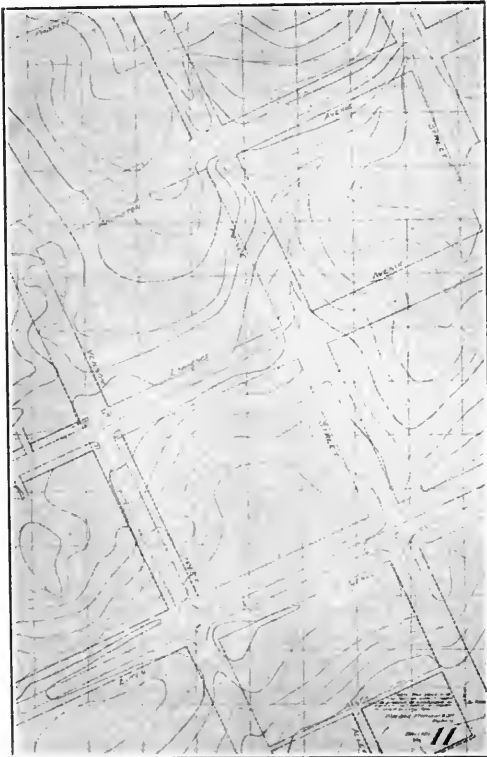
Second, there were few accurate records of the underground works of the city, and in many instances neither the size nor the location of various pipes was known. Information relative to underground structures was often a matter of speculation or of referring to old-time plumbers or workers in the city's employ.

Third, the only maps the city had, consisted of the various plats of different real estate subdivisions, together with various plain surveys and designs of street layouts, which were combined into large maps by a process of assembling these various plats. From the point of view of the ordinary individual these maps gave considerable information, but from the point of view of public works planning and recording information accurately, they were of little value.

Fourth, there were no dependable nor well-distributed monuments over the city for locating street and property lines, nor were there adequate bench-marks for preliminary layouts of water distribution lines and sewer lines.

As a whole, the needs of the city were plainly those of drainage, sewerage, an improved water distribution system, and a basis on which to build an intelligent city layout, and the needs of the engineering office were a full-time engineer and adequate maps for planning and recording the various public works improvements.

Realizing these necessities and the impossibility of making much headway without adequate provisions, the City Manager recommended to the Council accordingly, and upon the acceptance of this recommendation by the Council the firm of Gladding & Morrison, engineers, made an ac-



CONTOUR MAP OF A SECTION OF BRISTOL, VA., WHICH HAS BEEN ONLY SLIGHTLY DEVELOPED

curate map of the city, including topography.

Method of Making the Map

The coördinate system of control was followed. A government meridian had been established in Bristol, and this was taken as the basis of the coördinate system. The south end of the base line was assumed as 100,000 feet in latitude and 100,000 feet in longitude, and azimuths were carried from this line.

First, tape and transit traverses were run, distances being measured to the nearest 1/10-foot, and angles to the nearest 1/2-minute. Traverses averaged 2000 feet in length, and the average error of closure was one in eight to ten thousand. Transit stations were located on the sidewalk at each street intersection and at all breaks in direction of streets. The details of street property lines, curb lines, sewer manholes, water valves, etc., were supplied by azimuth and distance from these stations. Street property lines were accepted as they were found, and not necessarily as described in the various records of the city.

Levels were taken from a government bench-mark and run over the transit traverses, and were required to check with an error of less than 3/100 to 5/100 foot, depending upon the length of the circuit. Bench-marks were established over the entire city, and the elevations of tops of manholes and breaks in the grade of streets were taken at the same time. Topography was supplied by stadia from each transit station of the tape and transit traverse.

These data were platted to two scales, one to a scale of 1 inch to 300 feet, showing the entire city area, and another to the scale of 1 inch to 30 feet. Upon the smaller map street lines only were shown, and topography by 10-foot contours. On the

larger map everything of physical nature between property lines was shown, and topography by 5-foot contours. The relatively large interval of contours was chosen because the unevenness of the land and large difference of elevation within the city could be adequately portrayed without further refinement.

The large map was made upon detail paper in sections covering an area of 1,500 feet north and south by 900 feet east and west. Tracings were made of these sections, and adjacent tracings overlap each other 100 feet. The sections were outlined and numbered on the smaller map, which is used as an index.

Vandyke negatives and blue line prints were made from the tracings. Two sets of the large map were made of the city as a preliminary step. On one of these maps is located the sewer system so far as known, and on the other is located the water system. To each of these maps are being added from time to time all extensions to these systems. A complete design of sewers has been made, showing a definite plan for future development, and the water distribution system is being rearranged to meet the proper needs of the city.

The work of making the map was done by a party numbering occasionally, for stadia surveying, five men. The main part of the work was done, however, by a party of four men. These men made all surveys, platting and tracings. A progress report was kept which showed an average speed of two and three miles per day of traverse, including details, and four to six hundred acres per day of stadia survey for topography.

The entire cost of the map was approximately \$4,000. The total area is two square miles.

The Fairhope Plan

In the article on Fairhope, Ala., by Professor C. Montoliu, which appeared in the April issue of *THE AMERICAN CITY*, the credit for forming the basis of the author's conception for Fairhope should have been given to the educational system of the

School of Organic Education founded by Mrs. M. L. Johnson. Professor Montoliu is well known in the garden cities and town-planning movement, and is the Secretary of the Hispano-American Garden Cities and Town-Planning Association.

The Ideal City's Way of Dealing With Lawbreakers

Copyright, 1921

By Charles M. Fassett

Former Mayor, Spokane, Wash.; Former President, Spokane Chamber of Commerce

The Modern Police Court and Its Subdivisions

IN no other branch of civil government have there been such changes in the present generation as have taken place in our treatment of offenders against the law, and in few branches were changes so much needed. Government has two broad functions—to serve and to restrain, and as service grows and restraint lessens we know that civilization advances. Reform begins with the individual, not with legislatures, courts and jails. If we all understood that the first civic duties in a democracy are voluntary obedience to law and respect for the rights of others, there would be little need for correctional institutions.

In the modern city the offender and not the offense is the chief object of our interest, and we even look beyond the offender to his past history and his present environment, searching for fundamental causes of his delinquency. Creating a good citizen is our purpose, rather than punishing a misdemeanor. We study characteristics, surroundings and mental and moral development, hoping and expecting to reinstate the offender in the ranks of the law-abiding and make of him a creditable citizen. Dr. William Healy, who organized the Psychopathic Institute for Chicago in 1909, says: "It practically always requires the effect of environmental influences to create a criminal out of even a mental defective."

Police courts now have various subdivisions—night courts, children's courts, courts of domestic relations, traffic courts—where specific offences are handled by experienced and high-minded judges who realize human possibilities. The probation system is freely used and correctional institutions have a distinctly beneficent organization and purpose.

The Care of Delinquent Children

Children have been tried separately in our police courts only since 1899, Chicago and Denver leading the way. Before that time

they were indiscriminately mixed with hardened criminals and older offenders, and subjected to the evil influences of such contacts. The first exclusive children's court was established in Indianapolis in 1903, and this fine example has since been followed, not only in most of the leading American cities, but in many countries of Europe, including England, France, Belgium, Holland, Denmark, Switzerland, Germany, Russia, Austria and Hungary. We have learned many lessons in municipal government from European cities, but in this fine movement we have led the way.

New York now has five children's courts, presided over by judges of special fitness for this exacting duty. They have long terms and salaries of \$10,000 per year. In that city it has been found that the number of cases of child delinquency follows very closely the number of cases of improper guardianship, and that 70 per cent are directly traceable to that cause. The Denver Juvenile Court, presided over for many years by Judge Ben Lindsey, has been the model for many American cities. In it girls' cases are heard by a woman assistant, and the whole atmosphere of the court is that of kindly helpfulness and confidence. Probation officers and detention homes have taken the place of jail confinement, and the children are kept from debasing contact with criminals and given better training and care than they have had in their homes. Judge Lindsey established the practice of trusting the children to go alone to such correctional institutions as he determined to send them to, and in eight years out of 507 so sent only 5 have been lost. We realize now that it is better and more economical to open the door to a wholesome and productive life than to jail a juvenile delinquent.

The Court of Domestic Relations

A special branch of police court work has developed in the large cities in the settlement of family and marital differences

and abuses. Such courts invariably endeavor to reestablish satisfactory relations, and do so in more than half the cases brought before them. In the Chicago Court of Domestic Relations only about 20 per cent of the complainants are represented by attorneys. The Judge gets the parties before him, gets the story of the difficulty as best he can by sympathetic inquiry, without too much attention to court rules of evidence, and plays the part of family friend rather than legal arbitrator. Half or more of the cases he hears are the result of desertion, and the punishment of deserting husbands is usually prompt and stern. The personnel of the court includes a physician and a visiting nurse, and two secretaries, who hear and settle many of the quarrels.

Many cases are discovered requiring the help of outside social agencies, and the latter are kept closely informed. The seamy side of life comes to light in these courts, and their disclosures are always pathetic, particularly so when there are children involved. Some courts of domestic relations have jurisdiction over infractions of the laws regulating the employment of women and children in industry. The new court demands more than a knowledge of the law in its presiding officer; he must have tact, good sense, sympathy and vision.

The Probation System

A probation officer is as essential as a mayor in the modern city, and he will probably accomplish more real service to the community than most mayors. His career will not be so spectacular; he will not get into the newspapers so frequently; but he will have great influence upon the general well-being of the community, present and future. Before probation was established as part of our judicial system there were only three forms of court judgment for offenders—dismissal, fine, or imprisonment. But we have discovered that human failures have as many aspects as there are differences in human character, and that our stern and simple methods of treating delinquents do not fit in most cases. The indeterminate and the suspended sentence have opened the way for the probation system, whereby the court may exercise continuing care over delinquents while they are re-establishing themselves as useful members of society.

In most cases this treatment is effective

and thousands have been helped to self-respect and honest living by it. An ideal probation officer must possess fine qualities of mind and heart—firmness, kindness, faith, sympathy, discretion. It is not the position into which a broken-down policeman or a political heeler will fit; the success or failure of the plan will depend in large measure upon the man selected. Boston appointed the first probation officer in 1878, and in several cities he appeared prior to the establishment of juvenile courts. The probation officer greatly relieves the police court by settling neighborhood quarrels and family differences before they arrive at the police judge's door.

The Public Defender

It is an old axiom of the law that every accused person shall be considered innocent until he is proven guilty, but the public machinery of the law is geared to establish guilt, not to prove innocence. Police officers complain if those they arrest are discharged, and prosecutors endeavor to make a record of their number or percentage of convictions. Men with money employ sharp lawyers, wise to every trick and technicality, to procure their acquittal, but the poor man finds no friend in court. He is often the prey of the shyster and the professional bondsman, if money can be extracted from him or his friends. When Newton D. Baker was City Solicitor for Cleveland, Ohio, he took the position that "no merit is shown nor credit obtained by the mere fact of conviction, and that it is the duty of the prosecutor to see . . . fair opportunity given to the defendant to show both exculpatory and extenuating circumstances." A prosecutor who takes this position will not go far wrong, but this attitude is very rare.

The public defender, now a fact in several cities, has justified his existence by saving the innocent from punishment, by procuring leniency when it is the best public policy, by obtaining suspended sentence when imprisonment would bring starvation to a family, by making contact between charitable organizations and those needing their aid, and by saving much public expense in the confinement in jails of persons for whom liberty on probation is infinitely better for themselves and for society. The prisoner is interviewed and his statements investigated. If he has a worthy defense, his case is prepared and tried in court; if not,

his friends are notified and his personal business looked after in a sympathetic way. He is made to feel that justice is for the poor as well as for the rich. The public defender performs a useful function in caring for small civil matters as well as criminal cases. A report from Columbus, Ohio, for 1918 states that over one hundred civil cases had been tried and approximately four hundred adjusted outside of court.

Municipal Farms

While most cities confine prisoners awaiting trial and those convicted of minor offenses in city jails, a few American cities have provided tracts of ground and living accommodations for their prisoners outside their limits, where they can help themselves and the community by productive labor. Where the chief consideration for the delinquent is his return to freedom with hope and incentive to honest living, these municipal farms under proper management perform a great public service.

The city of Cleveland has several farms, totalling 2,500 acres, upon which it has grouped many of its charitable and correctional activities and established its municipal cemetery. Each activity has its own territory and its own buildings. The colony group houses its almshouse dependents and consists of separate dormitories for men and women and a home for aged couples where they may live together as long as both shall live. Its motto is "To lose money is better than to lose love." The sanatorium group holds the tuberculosis hospital and its administration building; the correction group is the municipal house of correction, and a separate farm of 500 acres is for truant and wayward boys. Wholesome living conditions are provided for all, and healthful and productive work in the open for all who are able to work. The evils of the jail system are entirely absent. There is no idleness, there is sanitation, decency, training and education, and the labor is useful and pleasant. The human side is never lost sight of. It is claimed that the land, which cost \$170 per acre, has increased to more than twice this value since the city bought it. Other cities are following the example of Cleveland, and the adoption of the municipal farm idea may well be made unanimous.

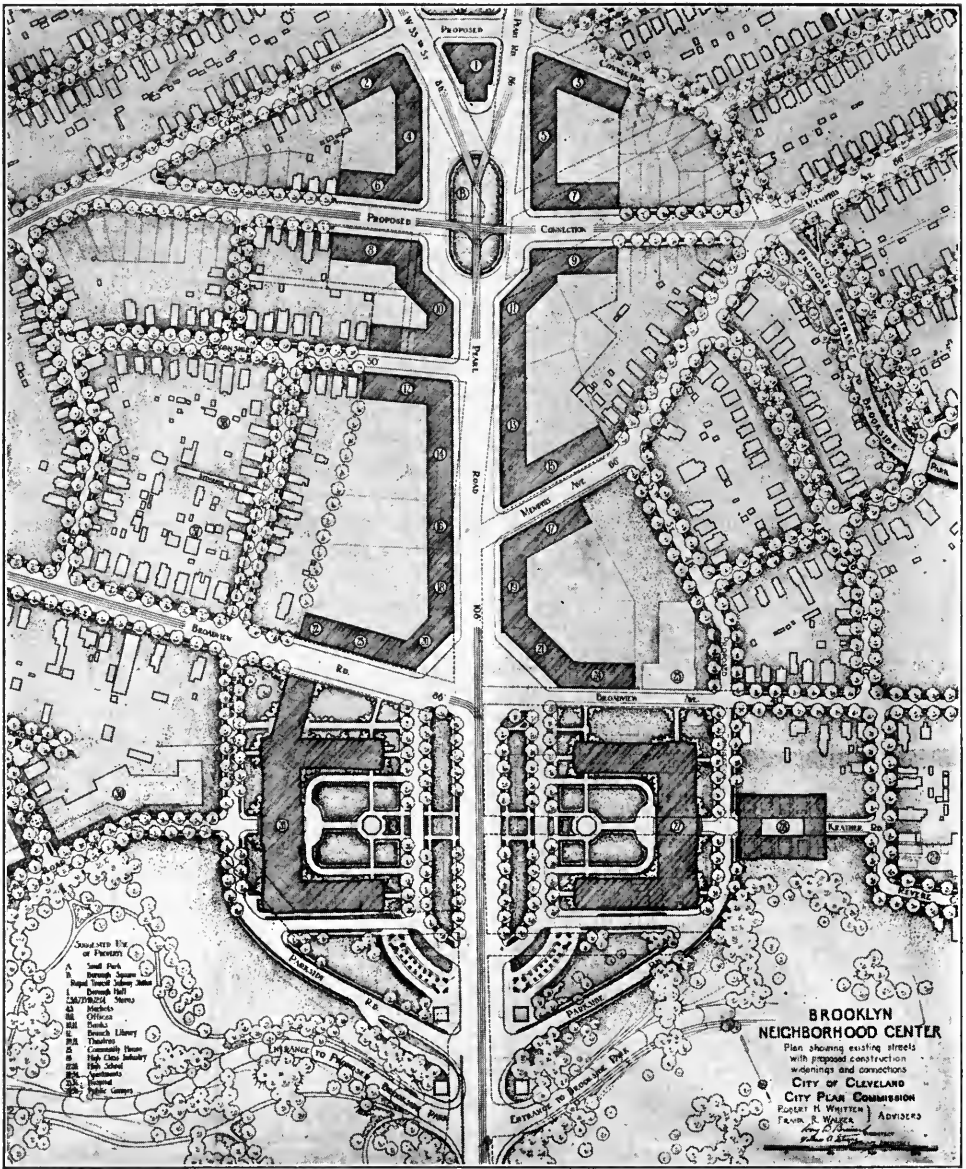
Jails As They Should Be

There are cities of considerable size in the United States where the jail is seldom occupied, but we cannot yet dispense with this institution in most cities. We can, however, and must, give it more care and thought than it is now getting. We must see that our jails are places in which those suffering confinement may be safe, secure and clean, and that their treatment is decent and human. The theory of confinement is that those who have not yet learned to respect the rights of others must be confined where they cannot infringe those rights, at least until they have learned better, but the usual practice tends to make them hate the law and turns them out enemies of society, deadlier, more efficient and more wary than when they entered.

Most persons confined in jails are there awaiting trial. They may be innocent. In fact, the proportion of convictions is small. But in most jails they find an unclean, foul-smelling, ill-ventilated cell, no room for exercise and scant provision for personal cleanliness, and are often exposed to moral and physical infection. The usual jail is a breeding-place for crime. The fee or contract system, still in existence in some cities, is an invitation to unscrupulous officials to arrest and confine the innocent, or trivial offenders, for profit.

St. Louis has a model jail and an industrial farm of 359 acres, where its industrial school is housed. The jail is a handsome and stately structure, six stories high, of Bedford limestone, as well built and cleanly as a modern hospital. The inside walls are of white glazed brick, the woodwork and the steel cells are covered with white enamel, and the whole building is kept scrupulously clean. Every convenience for cooking and serving food and maintaining sanitary conditions has been provided, as well as modern appliances for opening and closing cell doors and locking them in position. White and colored and men and women prisoners are segregated. In most cities the jail may well be the point of first attack for constructive municipal reform.

EDITORIAL NOTE.—This article forms one of the chapters from the forthcoming book on "Assets of the Ideal City," Thomas Y. Crowell Company, New York, publishers.



THE BROOKLYN NEIGHBORHOOD CENTER IS THE SECOND LINK IN A CHAIN OF COMMUNITY OR CIVIC CENTERS PROPOSED FOR VARIOUS LOCALITIES IN CLEVELAND

Group Plan for the Brooklyn Section of Cleveland

THE extensive area south of Big Creek Valley, including South Brooklyn, Brooklyn Heights Village and Parma and Royalton Townships, is rapidly developing and is destined to have a very large population.

The plan submitted also suggests a possible grouping and arrangement of other

buildings in this civic and commercial center. The exact locations and uses suggested are for the most part for purposes of illustration and suggestion only.

The community center plans are being worked out by Robert H. Whitten and Frank R. Walker, advisers of the City Plan Commission.

New Era for the District and County Fair

By Leonidas Willing Ramsey

UNTIL the last few years, county fairs, district fairs, and even state fairs, have been allowed to develop in a more or less haphazard manner, with the result that when the grounds became overcrowded and additions were made, these additions could only be developed independently and with no thought of the grounds as a whole. The faults of this failure to plan for the future are legion, and it is hardly necessary to enumerate them here.

The wisdom of securing an architect and a landscape architect to develop fair grounds has been conclusively demonstrated, for not only has a properly planned fair the best use of all its features, but the buildings are so arranged that each adds to the attractiveness of the whole. On a properly planned fair ground there is little confusion and no lost steps, for the locations of all areas are thought out in anticipation of their use. It has been demonstrated that a fair will pay in proportion to the amount spent in this judicious development, provided, of course, that there is sufficient population to draw from.

At the present time many fairs are being developed in the West, and in almost every case adequate plans for development have been secured—plans which should care for the fair needs for the next twenty-five years.

Meeting the Familiar Problems of the Fair Grounds

The directors of the Mississippi Valley Fair and Exposition, recently built in Davenport, Iowa, realized the advantage of expert advice in the development of their fair, and through the fair's permanent secretary, E. M. Bacon, plans are being carried out which will give Davenport, in a few years, a fair which is usually obtainable only after many years of evolution. Four hundred thousand dollars was spent upon the fair the first year, and a budget is being worked out which will mean the completion of the fair by 1925.

A crowd of 62,000 people was accommodated upon one day of the fair without con-

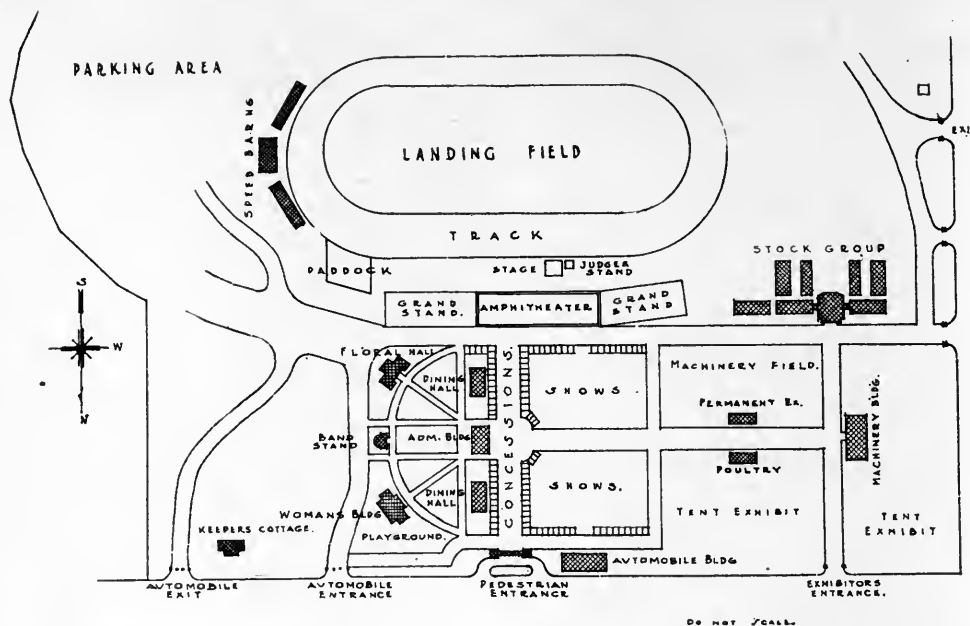
fusion; the parking areas, entrances, walks and roadways were so planned that congestion was reduced to the minimum. The automobile entrance was planned completely independent of the pedestrians' entrance and so arranged that after a car entered the grounds those occupying the car could get out at some convenient point, while the driver proceeded to the parking area. The cars never come in contact with the normal pedestrian traffic within the grounds.

It was realized that the first impression of a fair is given by the entrance gates, and that this impression is often a lasting one. The pedestrians' entrance was made large and attractive, 20-112 feet, composed of two towers three stories in height. The automobile entrance was planned in keeping with the pedestrians' entrance.

Although there was a mile track upon the grounds previous to the building of the Mississippi Valley Fair and Exposition, it was abandoned and a half-mile track built. At the present time the spectators are more concerned with seeing the horses or automobiles pass than they are with the time in which the race is run. Even the drivers seem to prefer a fast half-mile track. The track was built 100 feet wide on the home stretch, 80 feet at the turns, and 60 feet wide upon the far side. The width of 100 feet upon the home stretch affords ample space for the auto polo and circus acts which are a part of the modern fair.

The Buildings

The grand stand was built with a roof which slopes away from the track at a rather sharp angle, so that during fireworks displays and aviation exhibits it is possible for all in the grand stand to secure a good view of the entertainment. The grand stand was built at an angle to the track so that when those at the end of the grand stand towards which the racers come rise in their seats the view is not shut off from those in other parts of the amphitheater. The grand stand was built 70 feet from the track, as this space is salable in



THE MISSISSIPPI VALLEY FAIR AND EXHIBITION AT DAVENPORT ACCOMMODATED 62,000 PEOPLE IN A DAY WITHOUT CONFUSION

handling overflow crowds and also offers room for promenading during a long racing program.

The exposition buildings are grouped in an attractive manner, with a uniform style of architecture throughout. There are at the present time, or planned for in the near future, an exposition building, an agricultural building, a woman's building, an art building, and a building for industrial displays. An automobile building is planned large enough to display 75 makes of cars.

The stock barns are built in separate units, for the present veterinarian laws require that accredited herds of stock be separated from those unaccredited. A stock-judging pavilion is the center of the group; this building is used for stock sales at other seasons of the year. The speed barns are located upon the turn leading to

the home stretch, for when the race is finished the drivers wish to parade past the grand stand on their way to the stables.

A large area is set aside for permanent out-of-doors exhibits and for the display of machinery. A large machinery hall is planned, 100 by 200 feet. The area set aside for shows is located in close proximity to the line of travel, and much consideration has been given to the location of concessions. It is recognized that one of the fair's largest revenues comes from the sale of concession space, and this space can be sold only once if it is not located properly.

There is a picnic park upon the grounds, for as people come to spend the day, provision must be made for their comfort. Trees, shrubs and flowers, selected so that they will bloom during the fair season, add the finishing touches to the grounds.

The zoning resolution is the basic step in city planning; the new city planning that aims to bring order, coherence and coördination into city life. The older conception of a city as a formless, unrelated mass of blocks, growing as it will, tied together by the system of streets, developing haphazardly—this no longer serves the purpose. In New York this idea of a fungus has now given way to an organization of well-defined units of districts and neighborhoods, carefully coördinated to the plan of the whole city. Such is its theory, and New York came to accept it as a matter of self-preservation.—From "The New York Zoning Resolution and Its Influence Upon Design," by John Taylor Boyd, Jr., in *The Architectural Record*.

Forward Steps in Municipal Affairs

Mayors

An Aviation Field for a Small City

MODESTO, CALIF.—The municipal fair ground and aviation field in Modesto contains 53 acres of ground and can be enlarged, if necessary. It is on the outskirts of the city, but within the corporate limits.

When Modesto's first charter was adopted, ten years ago, it provided for the acquisition of a municipal landing field. During the past year the people of the city purchased the field at a cost of \$5,000. It is a beautiful level piece of ground lying along the north bank of the Tuolumne River. This field, which is recognized as one of the best in the state of California, has been the means of advertising Modesto throughout the entire country.

Two hangars in which to store flying machines have recently been completed. The building cost \$1,600, and one-half of it is now permanently rented for the sum of \$30 per month. The city has refused to rent the other half permanently, because it is needed in giving shelter to transient machines, which pay \$2.50 for each night they occupy the hangar. This small investment of \$1,600 is a profitable one for the city.

The field will be controlled by rules and regulations adopted by ordinance. Two-

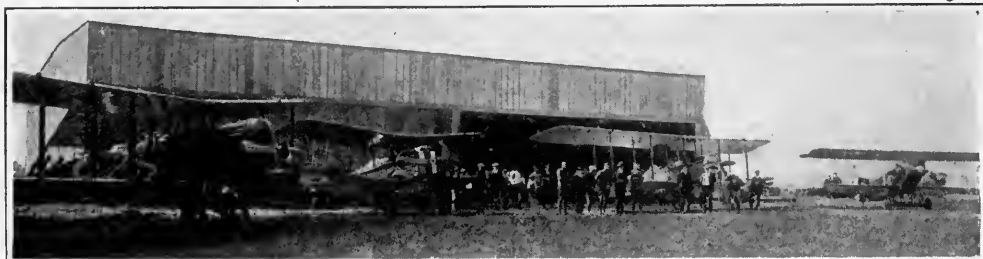
thirds of the tract will be devoted to fair grounds, and an appropriation of \$10,000 has been made by the county of Stanislaus. An expert fair-ground architect has been engaged to prepare a layout plan for the entire tract. His plan will be followed in the erection of every building, so that when the project is entirely completed, some years hence, Modesto's fair ground and aviation field will be one of the beauty spots of the state.

GEORGE J. ULRICH,
Mayor.

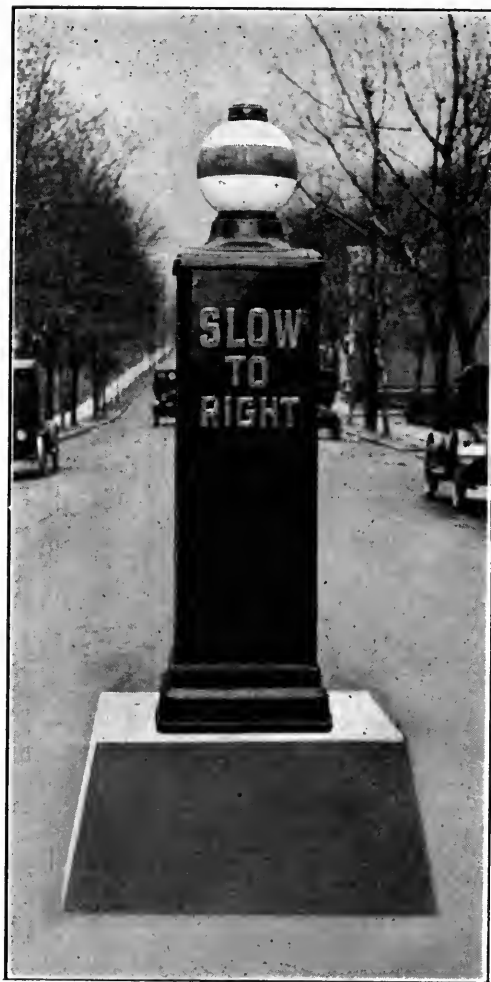
The Flashing Light Attracts the Driver's Attention

RUTHERFORD, N. J.—Considering the frequency of traffic accidents at such places, one of the most dangerous spots is the point at which an automobile leaves the open country and arrives suddenly in a thickly populated district. Such a place is on Union Avenue, near Beach Street, in this borough. Approaching Rutherford from the Passaic Bridge, Union Avenue for a considerable distance is all open country, with a splendid road that invites speeding. Suddenly the motorist passes a schoolhouse and a cross-road and runs into a well-built-up section of the borough. A strange driver does not get sight of a small lantern quickly enough, nor will a fixed light at all times draw his attention.

The value of the flashing or revolving light in lighthouses has long been recognized at sea. The principle is equally efficacious



THIS MUNICIPAL HANGAR IS ACTUALLY PAYING DIVIDENDS ON THE CITY'S INVESTMENT



A SMALL INTERMITTENT BEACON ATTRACTS ATTENTION EVEN ON A WELL-LIGHTED STREET

on land. A flashing light attracts attention and warns the driver that he is approaching a spot where caution demands that he slacken speed and be on his guard against accidents.

The light shown in the illustration, made by the American Gas Accumulator Company, Elizabeth, N. J., has been installed on Union Avenue. It never goes out day or night, and requires recharging only three or four times a year at a very small cost. It has eliminated the cost of trimming, upkeep and placing of hand lanterns, is more reliable at all times, especially in windy weather, and is not likely to be stolen, or broken by mischievous children. The ex-

perience with it in Rutherford has been most satisfactory.

FREDERICK W. SHEAF,
Mayor.

Departments of Education

Good Schools Are Assets to Any Community

WEATHERFORD, TEXAS.—The thriving little city of Weatherford, at the gateway to the Texas oil belt, recently voted three to one in favor of a \$200,000 school bond issue for the erection of a new high school, when informed by its School Board that the growth of the city's school population during the last few years had made its present equipment insufficient. Far-sighted action such as this, taken in the face of present business and market depression, shows the spirit of aggressive Americanism, which always builds for the future. It places Weatherford in the vanguard of American cities that are willing to make present sacrifices for the sake of the future development of its citizens.

A reputation for excellent school facilities is well worth keeping up; it pays in dollars and cents. Men from the oil fields are continually coming to locate in Weatherford, where their families can have the benefits of living in a residential city with good schools and churches, and which is close enough to Breckenridge, Ranger, and other oil centers for the head of the family to return to Weatherford to enjoy the week-ends at home.

The recent bond issue will finance the building of a high school on the large plot of land adjacent to the present one. The old high school will be used for a junior high school, thus relieving the ward schools of their two highest grades, and giving more room for the children of the primary and secondary grades.

The new high school will have the up-to-date improvements that modern times have developed, including a large auditorium with stage, a culinary department, and other equally useful features.

Weatherford's present school enrollment is 1,800, of which 500 are in the high schools. The rate of increase last year over

the preceding one was fully 20 per cent. When this enrollment is compared with the total population, about 8,000, it will be seen that Weatherford is establishing its character as a city of homes.

CHARLES H. COPE,
Executive Secretary, Chamber of Commerce.

Public Safety Departments

Safety Competition in Portland Schools

PORTLAND, ORE.—When the Oregon and Columbia Basin Division of the National Safety Council undertook to solve the problem of accident prevention, it conceived its work to lie not only among the adults of the district, not only with the men and women engaged in industry and using the streets and highways, but also with the boys and girls both in school and out. It requires only brief experience in attempting to handle the accident problem among adults to convince one that if the individual can be reached before he forms fixed habits of indifference, inattention, and recklessness, much more can be accomplished. In effect, this means that, if we prevent the formation of bad habits, we shall also prevent many accidents.

With this idea in mind, the General Manager of the Oregon Branch of the Safety Council approached the City Superintendent of Schools of Portland and the State Superintendent of Public Instruction and secured their cooperation. They responded promptly and eagerly to the suggestion. The State Superintendent of Public Instruction, J. A. Churchill, has gone so far as to incorporate safety education in the course of study. A

course in Safety Instruction* has been prepared under the direction of the manager of the Oregon and Columbia Basin Division of the National Safety Council with the cooperation of a committee of experienced teachers. This course, in book form, has been issued to every teacher in the state of Oregon with the instruction that in the grade schools it should be coordinated with the work in Civics.

The problems in Portland are the same as in all cities. In an attempt to make the work more effective, a Junior Safety Council has been organized, consisting of a committee from each of the elementary schools. Each committee has an advisor, either the principal of the school or one of the teachers. Meetings are held regularly and the subject of accidents is discussed. The work of the committee members is to spread safety education among the rest of the children. Each member of the committee is provided

PORTLAND PUBLIC SCHOOLS Traffic Accident Chart 1920-1921

SAFETY FIRST! STOP! LOOK! LISTEN!

Let us put the Axe in Accidents by Keeping this Slate Clean

Remember That a Red Disk in a circle below represents an accident to a pupil of the school indicated thereon

Holladay School



All Other Schools



Let no Red Blot mar this Escutcheon

Observe the rules for your safety. Never cross the street before looking both ways and then only at regular crossings. Avoid jumping on moving street cars or hitching on automobiles. Playing on unroped streets may cause you an accident. REMEMBER that an ounce of forethought is worth several pounds of substantial regret.

"He is free from danger who, even when safe, is on his guard."—CYRUS

(Courtesy National Safety Council)

**EVERY CHILD DID HIS BIT IN KEEPING HIS SCHOOL
RECORD CLEAN**

with a safety button indicating that he or she is a member of the Junior Safety Council of Portland.

In order that the committees may have

* See department of Municipal and Civic Publications, this issue.

something definite to work on, a monthly bulletin is issued which takes up certain hazards and proper methods of avoiding them. The work of the school semester has been divided into four parts, and a bulletin has been issued covering each part, as follows:

- Part I: Traffic Accidents
- Part II: Home Accidents
- Part III: Fire Prevention
- Part IV: Playground and Recreation Accidents

As a visible incentive to the various schools, a Traffic Accident Chart has been distributed. The chart, shown in the illustration on page 483, is provided with a row of circles under the name of the school, in which a red disk is pasted whenever there is an accident to a child in that school, and with other circles below to be filled with red disks to represent accidents to children in other schools. On the disk is printed the name of the school to which the unfortunate pupil belonged, and the date of the accident. Disks are issued to all the schools by the Superintendent of Schools, and are pasted on the charts by the principals.

As a further method of stimulating the interest of the pupils and keeping the committees actively at work, one man, H. P. Coffin, devotes his entire time to a continuous round of visits to the schools. He meets with the committees, talks to the pupils in assemblies, and in general keeps the ball rolling.

That this work is worth while and gets results is evident from the fact that since the program was started last fall there have been only eight traffic accidents to children in public schools reported, and no deaths.

HUGH H. HERDMAN,
General Manager, Oregon and Columbia Basin
Division, National Safety Council.

Public Welfare Departments

If You Want to Know, Ask

PHILADELPHIA, PA.—In its Bureau of Municipal Research, Philadelphia has an agency for civic betterment which has proved its value at home and commends itself to other cities. The advice and aid of the Bureau are always at the disposal of the citizen and taxpayer. It is interested in ef-

Why Secrecy About City Funds?

WHY does not the Sinking Fund Commission furnish Council the facts which Council has asked for about the sinking fund?—facts which Council needs in order to fix a proper tax rate for sinking fund purposes?

Is it true that the Sinking Fund Commission has \$4,000,000 of public money more than it actually needs; that much of its money is needlessly uninvested, and that the true amount of the sinking fund surplus is concealed by "writing down" assets and suppressing information?

If this is true, it has a large bearing on the tax rate.

Taxpayers of Philadelphia were saved seven cents on the 1917 tax rate, because the Bureau of Municipal Research, through publicity and co-operation with the Finance Committee of Councils, forced the sinking fund commissioners to give up over \$1,160,000 to which the fund was not entitled.

Why is it that certain pertinent information, which official annual reports used to boast of, has been continuously suppressed since that 1917 tax rate was fixed?

By what right did the commission neglect even to acknowledge receipt of Council's resolution, passed in November, 1917, unanimously demanding this information?

On July 27 of the present year the new City Council made a new request, unanimously demanding this and further information about the sinking fund by September 7.

On September 7 newspapers said that two of the three sinking fund commissioners had signed a report to Council, and that the third commissioner was willing to have the report go to Council without his signature.

Why has not Council received the report?

Why is this?

No one seems to know. Certainly, you as a taxpayer do not know nor can you understand why. Neither can we.

FOR years the sinking fund commissioners had boasted of 20 per cent more money in the sinking fund than was required to meet the city's debt. This was nothing to boast of, as it meant that the taxpayer was being taxed annually for more money than the city required.

The sinking fund now exceeds \$45,000,000. Thirty-eight million dollars of this amount represents Philadelphia city bonds bought and owned by the sinking fund commission. How many of these should be standing unencumbered, when the purpose of the sinking fund is to pay debt, and the new City Charter requires cancellation?

Why is much of this money uninvested, when it could be earning five or six per cent? Is \$20,000 to \$30,000 more income a year for each uninvested million dollars not worth having?

How much of the \$45,000,000 is actually needed for the fund's legitimate purpose?

Who knows, and why do they hesitate to tell Council?

The Bureau of Municipal Research has fought for years against this secrecy, against defiance of Council and defiance of public opinion.

The Bureau unhesitatingly asserts that a thorough investigation should be made of the sinking fund; that the Sinking Fund Commission should be made to comply with the law; that Council should assert its authority, enforce reorganization and put life into the fund.

This should be the first of a series of steps toward a unified and simple program of public finance that will

- bring public business out into the open;
- MAKE the City really "pay as it goes";
- render the City's assets suitably mobile and available;
- efface the last vestige of a "tin-box" financing;
- make the finances and accounts of the City of Philadelphia as simple, as well managed and as easy to understand as is humanly possible.

Clip this coupon at once and let us tell you what the Bureau of Municipal Research has already accomplished to simplify city finances and put an end to secrecy about city funds.

CITIZEN'S COUPON (47)

Members of Municipal Research and Franklin Bank Building, Philadelphia.

I desire to know more about the sinking of your organization and I am particularly interested in the following:

1. Citizens' accounts	2. A better lease system
3. Municipal bonds	4. Desires for the people the city
5. Municipal bonds	6. Public
7. Municipal bonds	8. Municipal bonds
9. Municipal bonds	10. Municipal bonds

Name _____

Address _____

BUREAU OF MUNICIPAL RESEARCH

805 Franklin Bank Building

Bel—Spruce 1823

KeyStone—Race 2530

This advertisement is used for by a public-spirited citizen who is a member of the Bureau of Municipal Research

SPECIMEN OF THE PUBLICITY EFFECTIVELY EMPLOYED BY THE PHILADELPHIA BUREAU IN SPREADING CORRECT INFORMATION ON CIVIC QUESTIONS

ficient methods of civic government, producing service, with businesslike machinery, without friction. It has no axes to grind; it is not interested in personalities or politics. It is not after something for itself, but is working for the greatest good of the greatest number.

The Bureau is composed of some two thousand public-spirited citizens, men and women. They have organized, established offices, and entered upon a campaign of publicity, both to familiarize people with the existence and scope of the organization, and to further certain specific reforms. The advertisement on page 484, reproduced from the *Philadelphia Ledger*, shows the spirit of this publicity. The Citizens' Coupon at the bottom is especially noteworthy, as it indicates one way in which the Bureau is prepared to assist the average citizen, by supplying him with accurate and timely information on pressing civic questions. This information is furnished by a staff of technical experts, who establish close working relations with the various city departments.

The Bureau has already taken an active and disinterested part in municipal affairs. It criticized the proposal of the city government for its project to purchase the Holmsburg water-works for \$850,000; and it has been equally insistent in scoring the individual citizen for allowing water in his home to run to waste. It opposed the plan to take away local control of the police and lodge it in Harrisburg, and it has promoted the efforts to give Philadelphia power to hire its own street cleaners, although these campaigns involved opposition to a particular political group in one case, and support of the same group in the other—a convincing demonstration of the fact that the Bureau is interested solely in civic progress and not in political personalities.

Among the measures for which the Bureau is working at the present time are those for cleaner streets, higher pay for teachers, fair play and fair pay for municipal employes, a better water-supply, justice for the poor in the city's courts, constitutional revision, and the correction of mandamus abuses. The Bureau has devoted especial attention to the city's finances, and the taxpayers of Philadelphia were saved 7 cents on the 1917 tax rate because the Bureau, through publicity and cooperation with the Finance Committee of the Councils, induced the Sinking Fund Commissioners to turn

over \$1,160,000 to which the Fund was not entitled. In the work of the Council on the budget for 1921 preparatory to fixing the tax rate, the Bureau backed up the demand of the Council for exact information concerning the status of the Sinking Fund. A characteristic piece of publicity on this particular issue is shown in the accompanying illustration. The Bureau is also active in agitating the abandonment of the present system of contract street cleaning.

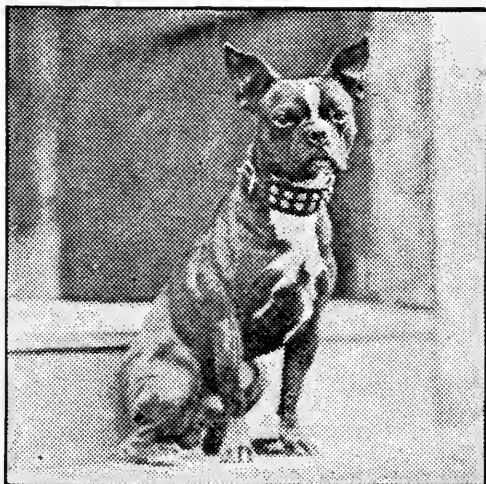
The Bureau of Municipal Research has justified itself both by the singleness of its purpose and by the efficient way in which it has carried on its campaigns. Its address is Franklin Bank Building, Philadelphia.

C. H. THOMAS.
Kennett Square, Pa.

City Clerks

Dog Days in New Bedford

NEW BEDFORD, MASS.—Every dog has his day in New Bedford, providing he is a good dog. Here is the scheme. In the preparation of the dog license blanks for each year, the city clerk uses a picture of the No. 1 dog (that is, the dog holding the No. 1 license) for an illustration. This plan has been in use for the last four years. The first dog so honored was Tempest, a



MIROUF'S OWNER APPRECIATES THIS,
ALTHOUGH MIROUF CANNOT

pointer belonging to Dr. Henry M. Knowles. Tempest was a great favorite with the traffic police, and made a practice of assisting them in directing traffic at the principal business corner of the city. The second dog to get his picture on the license was Mayor Ashley's Towser. Towser nearly broke up the inauguration proceedings one year by walking on to the platform where the Mayor was reading his address and planting himself directly alongside. Tipperary, an Irish terrier belonging to Dr. C. J. Leary, was the dog on the license last year; and this year Mirouf, a Boston bull belonging to Arthur W. Forbes, manager of the Rhodes Eyelet Factory, is the dog of honor. The scheme is attracting much attention among dog owners, and is likely to be adopted in other places.

W. H. B. REMINGTON,
City Clerk

Recreation Departments

Municipal Swimming Parties for Children

PATERSON, N. J.—“Water, water everywhere, but not a drop to drink,” was the plaint of the Ancient Mariner. This has been modernized by the children of Paterson, N. J., into “Water, water everywhere, but not a drop to swim in,” for Paterson is almost surrounded by a river which is made unfit for bathing because of the factories and dye waste.

The Board of Recreation, a municipal

commission, found that hundreds of the 25,000 children lived miles away from the public bathing beach above the Passaic Falls and had never been in swimming. In order to give the youngsters an opportunity to enjoy this healthful summer diversion, the Superintendent of Recreation, Dr. L. R. Burnett, secured the loan of several large trucks from public-spirited business men, and also used the municipal truck, for transporting groups of boys and girls to the park beach.

Girls and boys under 14 years of age were gathered by the directors at playgrounds, a series of trip schedules for trucks having been arranged. Some children were ready with lunches at 9 A. M. to go for an all-day trip, while others started at 1 P. M. The trips were personally conducted by school nurses, who remained with their parties and returned with them on trucks at 5 P. M. The eight school nurses as well as the twenty-four playground directors are under the direction of the Superintendent of Recreation, and their combined efforts accomplished unusual results. The method of supervision was probably unique, and it secured the coöperation of parents.

During July and August daily trips were made, carrying 350 children on hot days from the congested districts to the beautiful parks bordering the river. The trucks were decorated with cloth signs bearing such labels as “Goin’ Swimmin’! Yes, Sir!” “Board of Recreation—Picnic for Kiddies” “Are We Happy?” “Out for a Day” and “Picnic at the Swimmin’ Hole.”

The boys made up yells while the girls sang songs as the trucks went singly or in twos through some main street, and much attention and favorable comment was aroused.

Trucks with high sides were used, and no accidents occurred.

The municipal swimming masters had charge of the bathing areas, and many boys and girls took their first swimming lessons.

L. S. BURNETT,
Superintendent of Recreation,
Paterson, N. J.

EDITORIAL NOTE.—The plate on page 375 of the April issue showing the motor pressure sprayer in Spokane, Wash., should have been credited to Parks and Recreation.



A PERSONALLY CONDUCTED TRIP TO THE SWIMMIN' HOLE

Reciprocating Steam Engines for Municipal Power Plants*

By W. F. Schaphorst, M. E.

EDITORIAL NOTE.—This is the second of a series of articles on the selection of power-plant machinery, written specially for THE AMERICAN CITY as a guide for municipal officials who are not familiar with power-plant apparatus and who do not know how to proceed in order to come to a decision in such matters. There is no book in print that clearly sets forth comparisons and gives efficiencies of different types of apparatus used in the municipal power-plant field. The first of this series, which appeared in the April, 1921, issue of THE AMERICAN CITY, discussed the subject of steam turbines for municipal power-plants.

ALTHOUGH the steam turbine has made and is still making remarkable progress in the municipal power-plant field, the reciprocating steam engine is still holding its own within certain limitations. The reciprocating type has held, and probably will hold for years to come, a service record in steam power plants never approached by any other type of prime mover, especially in sizes up to 1,000 horse-power. While it has been developed and perfected in different types with a view to great reliability of service, the matter of exceedingly high economy has been to a greater or less extent disregarded. In recent years builders have sought ways and means to eliminate the chief causes most detrimental to efficiency, and to approach as nearly as possible the perfect engine.

A prevalent assumption is that it is not possible to obtain excellent results in steam economy in operating non-condensing with other than high pressures and atmospheric exhaust, and often it has been stated that because an engine is to exhaust against 5 or 10 pounds back pressure, it makes little or no difference what the efficiency of the engine is. This is seldom true, however.

Economy has been sought by manufacturers from every angle. To accomplish the desired result, many different types of reciprocating steam engines have been developed, all with more or less complications and limitations, preventing their successful operation under high pressures and temperatures and at medium or high speeds, except with great cylinder condensation and leakage losses. To overcome these limitations and to meet present-day requirements as to speeds and pressures, much study has been given by the engineering

profession.

One of the serious objections to the reciprocating engine is the variable factor "leakage," which depends upon a number of conditions, principal among which are these:

1. Engine workmanship
2. Care given the engine by the operator while in operation

For example, a simple non-condensing engine after only 30 days of operation showed leakage of over 13 pounds of steam per horse-power per hour; while on the other hand a simple non-condensing engine after operating four years operated almost as economically at the end of the four years as when new. The steam turbine has the advantage over the steam engine in this respect, leakage being the same when new as it is after many years of service.

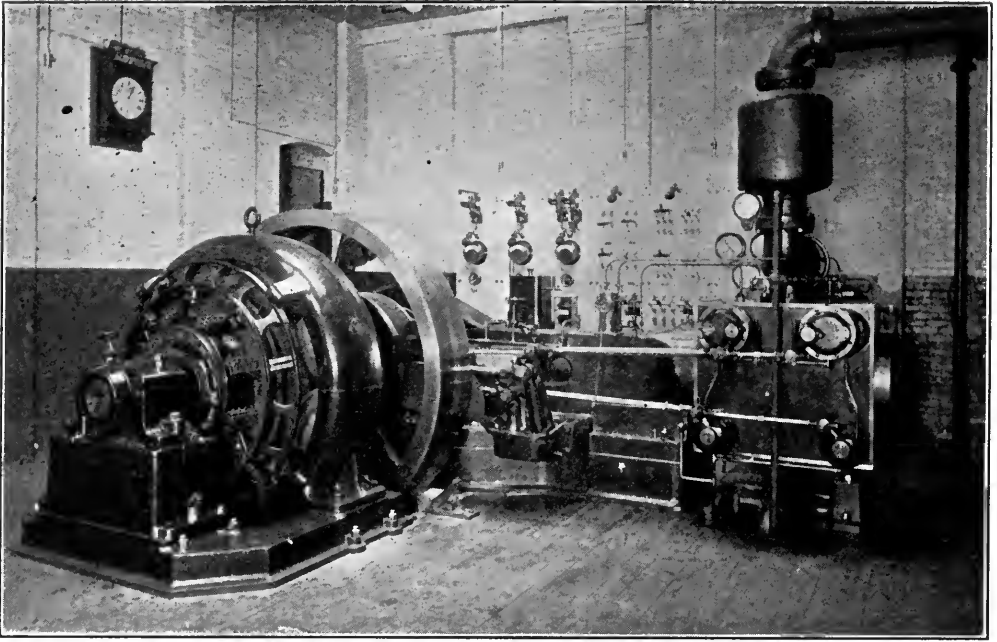
In general, the larger the steam engine or turbine, the more economical it is; the smaller the engine or turbine, the more wasteful.

To assist the municipal authority so that he can select the most worthy steam engine candidate for his plant, the writer will outline the features of each type. Only the outstanding features or arguments that are of greatest importance to the purchaser will be brought out.

Types of Reciprocating Engines

Reciprocating steam engines of to-day may be divided into three groups: (1) Simple engines; (2) Corliss engines; (3) uniflow engines. The first dates back to the time of James Watt; the second was developed by George Corliss at about the time of the Civil War; and the third was invented in 1886 and following years by an Englishman, L. J. Todd.

* Copyright, 1921, by W. F. Schaphorst.



MODERN NON-RELEASING TYPE OF CORLISS VALVE ENGINE OF THE SIDE-CRANK TYPE

The Simple Engine

There are many designs of simple engines with a multitude of valve types, the most common of which is the slide valve, which alternately opens and closes the steam-ports and which is operated by an eccentric. Simple engines are operated either non-condensing or condensing and at high or low speeds. This engine, though, is really too simple and too wasteful for use in the municipal power-plant unless for driving auxiliary machinery or for occasional peak load service. The first cost is low per horse-power—about one-half the cost of more efficient engines. We will give the simple engine but little consideration for the municipal plant.

The Corliss Engine

There are many special designs and variations of the Corliss valve, which is installed in groups of four and opens and closes the steam-ports by rotating back and forth. Some use the familiar dash-pot releasing gear. Later designs, especially high-speed Corliss engines, are using the now well-known non-releasing valve gear.

It is believed by some who are not conversant with engineering, that there is no longer a field for the Corliss engine, that it is out of date, that it is too large and

unwieldy, and that it is not as efficient as the steam turbine or other modern types of prime movers. These statements, however, are far from the truth. The real advantages of the steam turbine are seldom realized until one reaches the capacity of about 300 kw. Between 300 kw. and 500 kw. the purchaser should carefully weigh the respective merits of the reciprocating engine and the steam turbine. At 500 kw. and higher the Corliss engine has very little in its favor and the steam turbine is generally preferable.

Even above 500 kw., however, up to as high as 2,500 kw., if the exhaust steam can be used for heating, for ice making, or in any other economical combination, there are no serious objections to the use of the Corliss engine. One manufacturer is now building a 2,500-kw. cross-compound Corliss engine unit to operate non-condensing, and this order was secured entirely on the question of economy in competition with steam turbines. If a Corliss engine is already installed and it is desired to increase the capacity of the plant, the most economical procedure might be to install a low-pressure steam turbine and operate it with the exhaust from the Corliss engine.

One of the objections to the steam turbine advanced by the manufacturers of

Corliss engines is that the steam turbine thrives only on high vacuums. The higher the vacuum, the greater the economy of the turbine. It is not always an easy matter to maintain a high vacuum, especially during the summer months when cooling water is scarce, or when the temperature of the cooling water is high. Corliss engines, on the other hand, give sufficiently high economy at 24 inches of vacuum, a vacuum that is easily maintained throughout the twelve months of the year. The latest type of Corliss engines will operate successfully under steam temperatures that can be used by any other type of steam prime mover, and its steam consumption will be less than that of the steam turbine when vacuum is less than 26 inches, and lower than any other type of reciprocating steam engine under all conditions. The Corliss engine requires less cooling water, less spray pond area, a smaller cooling tower, etc. Much depends upon local conditions in the selection of the prime mover, hence the water questions alone may be an important enough factor to give preference to the Corliss type of engine.

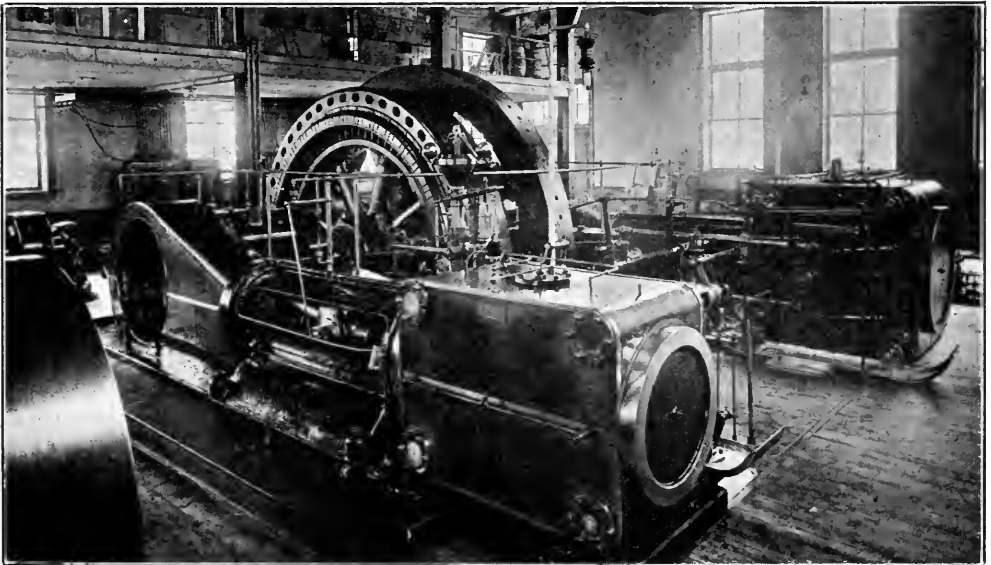
The Corliss is an excellent engine for operating on variable loads. That is, it is practically as economical when running at three-quarters load as when running at full load. Besides, it can be overloaded usually by 25 per cent and still be about as efficient as when running normal.

The municipal authority will therefore do well to seriously consider the Corliss engine for loads up to 300 kw., but from 300 kw. to 400 kw. he should begin to listen attentively to the turbine salesman.

First Cost and Reliability

Although first cost is too often one of the dominating points in making power-plant purchases, and although economy of operation is also considered very important, the most important point of all in the municipal plant is reliability. If the engine is unreliable, if it stops every once in a while, if it is likely to explode or break down, or if it is liable to wear out in a short time, its use certainly should not be encouraged. The Corliss engine has proved itself to be thoroughly reliable in every respect, some Corliss types having been in use for so many years that the users claim they will apparently never wear out. As now made, with its non-releasing gears, it is practically fool-proof. It is a long step in advance of the old dash-pot type.

The Corliss engine is frequently "compounded" and "cross-compounded," or occasionally it is arranged in tandem. In a cross-compound engine the cylinders are placed side by side, each cylinder having a piston rod, a connecting rod, and a crank of its own. A fly-wheel is usually placed between the cranks. The cross-compound design is still commonly used in municipal



A CROSS-COMPOUND CORLISS ENGINE WITH FLY-WHEEL BETWEEN THE CRANKS

power-plants. In tandem engines the cylinders are placed in one line, both pistons being on the same piston rod and both cylinders transmitting power to the same crank. The tandem engine is seldom used these days, although one may be occasionally specified to advantage on account of space conditions.

The manufacturers of the Corliss engine claim that as compared with the Diesel oil engine, it is far more reliable, the up-keep cost is much less, and the life is much longer. They admit, though, that the Diesel has its own field in the same way that the Corliss engine, the simple engine, and the uniflow engines have their own fields.

"Cylinder condensation" is one of the most serious objections to the Corliss engine, as well as to the simple engine, whether condensing or non-condensing, whether single expansion, double, triple, or quadruple expansion. Many efforts have been made by engineers to eliminate this loss. Rankine says with reference to cylinder condensation: "In some experiments the quantity of steam wasted through alternate liquefaction and evaporation in the cylinder has been found to be greater than the quantity which performed the work."

To reduce the loss due to cylinder condensation, high engine speeds have frequently been resorted to, so that we now have the so-called "high speed" types as well as the "low speed" types. High speeds actually reduce cylinder condensation losses, but the overall efficiency of the engine is nevertheless not increased, and besides, the life of the engine is shortened. The life of a low-speed engine varies from 20 to 33 years, whereas the average life of the high-speed engine varies from only 10 to 20 years.

Superheating the steam is one method employed to reduce or eliminate the loss due to condensation. There is no question but that superheat increases the efficiency, but there is such a thing as carrying superheating too far. In reciprocating engines it is found that cylinder condensation is eliminated if superheated steam can be carried just up to the point of cut-off, or, according to Ripper, about 150 degrees Fahrenheit superheat is sufficient.

It has also been found that it is best to use superheated steam with all engine speeds where the cost of fuel is high and where loads do not fluctuate violently.

In order to show the advantages of superheated steam as compared with non-superheated steam, and at the same time to show the economy of reciprocating engines, we have records of the best current practice in Germany where simple non-condensing engines produce one horse-power per hour on 19 to 22.3 pounds of steam per hour. Using steam superheated 260 degrees Fahrenheit, the consumption dropped to 13.4 to 16.1 pounds of steam per horse-power hour.

In Germany, again, a simple condensing engine operated without superheat on 16.3 to 17.5 pounds of steam per horse-power-hour, whereas with 260 degrees Fahrenheit superheat the consumption dropped to 10.0 to 11.6 pounds of steam per horse-power-hour.

Compound condensing engines without superheat show rates of steam consumption as low as 11.98 pounds of steam per horse-power per hour, and as high as 16.8. With 307 degrees superheat the rate drops as low as 8.99 pounds of steam per horse-power per hour. At 260 degrees Fahrenheit superheat the consumption is given at 9.4 to 11.2 pounds of steam per horse-power per hour.

Triple compound condensing engines give slightly better economy than compound condensing.

Where exhaust steam cannot be used profitably for heating, ice making, drying, or other industrial purposes, Corliss engines should usually be operated condensing, because the condensing engine is much more economical as regards steam consumption. Back pressure should be kept down as low as possible. If there is any unnecessary back pressure at any time it is certain to result in an unnecessary loss. For example, according to actual engine tests a simple four-valve non-condensing engine consumes 35 per cent more steam than a similar condensing engine. A compound four-valve non-condensing engine uses 54 per cent more steam than a similar condensing engine. A simple engine with steam slightly superheated uses 25 per cent more steam when operating non-condensing than when operating condensing, and the same engine when operated with 260 degrees superheat uses 36 per cent more steam when non-condensing than when condensing. Lastly, a compound steam engine using superheated steam requires 27 per cent

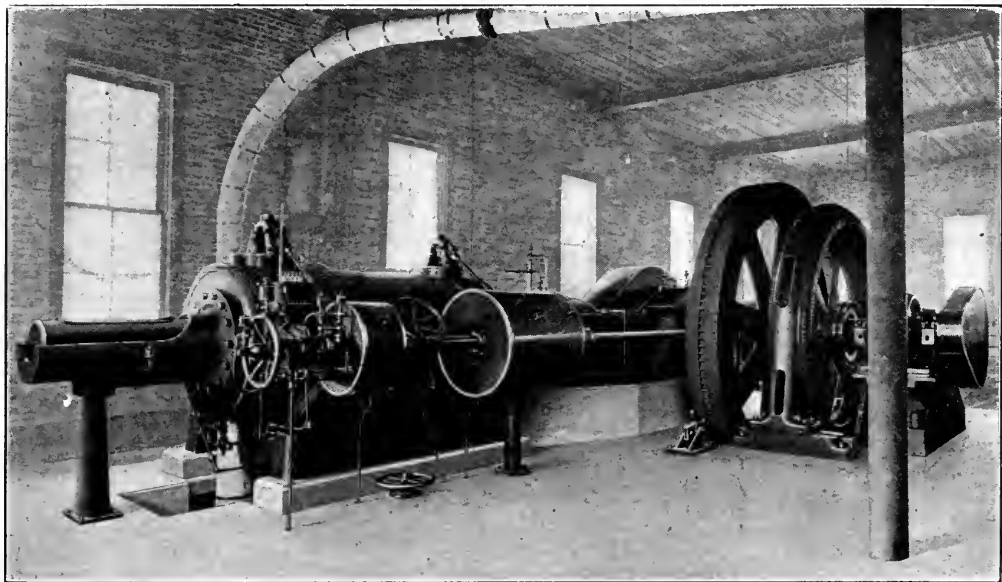
more steam when running non-condensing than when running condensing.

Non-condensing compound Corliss engines have been made and have been used, but commercially they proved to be unsuccessful without utilizing the exhaust, although they produced a horse-power per hour on as little steam as 16.13 pounds.

The Uniflow Engine

Of all reciprocating engines in the municipal field the uniflow engine is to-day commanding most attention. It is more effi-

One prominent manufacturer of the uniflow engine does not claim the engine to be universally useful, but to have its own special field. The manufacturers of this particular engine claim that their product is now to be found in plants of all sizes where high economy in the use of steam is desired, and that its outstanding characteristic is its ability to carry an extremely wide variation in load with but small variation in economy. In fact, it is claimed that with a load ranging from 25 per cent to 125 per cent of normal, the economy does not vary more



A NORDBERG-TODD UNIFLOW ENGINE BUILT FOR PORT WASHINGTON, WIS.

This engine is direct-connected to a 500-kv.-amp. generator, and runs at 150 r. p. m. at 140 pounds steam pressure

cient than the older types of reciprocating engines and is replacing many of them. It even competes with the steam turbine in sizes up to 1,500 kw. or even higher. The reason for the higher efficiency of the uniflow engine is easily understood.

In the uniflow engine the length of the piston is usually equal to or greater than the diameter of the cylinder. The piston itself serves both as a piston and as a slide valve. The engine gets its name from the "one direction flow" of the steam. Operating on a strictly "uniflow" principle, steam is admitted through valves in the usual way and is exhausted at the middle of the cylinder by the uncovering of the ports by the piston.

than 10 per cent. The steam consumption at normal load is practically the same as in the high grade compound Corliss engine, but it is less for other loads.

Furthermore, this particular make of engine is designed to run either condensing or non-condensing, features which readily adapt it to conditions where steam for heating is required during the winter but not during the summer. When this engine operates non-condensing, it is simply necessary to bring into action a set of "auxiliary exhaust valves" provided for the purpose. In this case the greater volume of steam is exhausted through the central ports, and the balance through the auxiliary valves. These valves are instantly brought

into or cut of action by the operator whenever necessary.

This particular make of uniflow engine is provided with improved "double beat" poppet valves, which the manufacturers claim will always remain steam-tight. These valves permit the use of very high steam pressure and high superheat, advantages too frequently lacking in other reciprocating steam engines. This type of uniflow engine is built in sizes ranging from about 200 to 2,000 horse-power, most of them having been built for municipalities and for medium-sized central power-plants.

As compared with the steam turbine, it is claimed that the uniflow engine has a better over-all efficiency than the turbine for underloads and overloads. Inasmuch as most municipal power-plants operate with a considerable variation in load, uniflow engines give a very good over-all efficiency for such service. Further, since the uniflow is adapted to run either condensing or non-condensing, nothing serious occurs if a strictly condensing uniflow engine should suddenly lose its vacuum. This would be impossible in the case of a steam turbine designed to run condensing.

It is claimed that there is no need whatever for exhausting steam from the uniflow engine into a low-pressure turbine, because the uniflow engine is designed to take care of the whole range of steam expansion in one cylinder. Another uniflow engine advantage is: exhaust valve leakage is almost entirely eliminated because the exhaust port is never under high pressure. The design of the uniflow system reduces leakage to the minimum, and the design also reduces back pressure to the minimum.

As for the first cost of a uniflow engine, this is somewhat greater than the first cost of the steam turbine, but this additional cost is more than offset by the greater efficiency of the uniflow engine when operating under variable load.

The following is a table of loads and steam consumptions of a typical municipal power-plant engine. This is a 24 x 36 uniflow engine direct-connected to a 500-kw. generator, the engine operating at 150 r.p.m., with 150 pounds steam pressure, 150 degrees superheat, and 26 inches of vacuum.

Load	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	Full
Kw.	125	250	375	500
I.H.P.	219	404	579	754
Lbs. steam per horse-power				
hour	11.6	11.3	11.8	12.5
Approx. lbs. of steam per kw.				
hour	20.3	18.3	18.3	18.8

To be sure, the uniflow engine is not perfect, being comparatively new in the power-plant field. The prospective purchaser should know the principal objections advanced, to be certain that these objections will be avoided in his engine, if possible.

The chief objections to the uniflow engines are:

1. The high compression in non-condensing engines.
2. The higher cost of the engine as compared with other steam engines of equal power. This objection, of course, cannot be avoided.
3. The uniflow is still in the experimental stage. More development is needed.
4. The valve gear is not rugged enough.
5. At light loads and at starting there is noise from the valves.
6. In one installation it was necessary to put motors in the fly-wheels to change the speed when running.
7. Trouble has been experienced with cylinder fractures.
8. Valve adjustment is too fine.
9. For best results it is necessary to use superheated steam and run under a vacuum.

Yet in spite of these arguments, the fact remains that the first successful uniflow engine built in the United States was built in 1911. It is still in constant operation in the City Water & Light Plant at Cedarburg, Wis., where it is claimed to be giving excellent service. That particular engine was equipped with Corliss valves, a design that has since been abandoned because of modern high steam pressures, the inability of the engine to use superheated steam, and the non-adaptability of the valve gear for moderate rotative speeds.

Belt-driven Generators

In former years belts were used a great deal for transmitting power from the steam engine to the generator. The method is still commonly used, but it is not to be recommended for modern plants unless space is no object, or unless it is desirable to utilize an old belt-driven generator which happens to be on hand. A belt-driven generator usually costs less than a direct-connected generator, but since more space is required, this additional saving may be more than offset by the additional cost of the space. Practically all municipal power-plant uniflow engines are direct-connected to the generator and do not drive through belts. Belted Corliss engines are commonly found throughout the country.

Where a belted generator is selected, it

should be remembered that the efficiency of the plant is dependent to a surprising degree upon the efficiency of the belt transmission. Belt transmission, though, need not necessarily be inefficient. Efficiencies as high as 98 per cent have been recorded; 95 per cent, at least, should be obtained with any important main drive, as in a municipal power station. This is attained by accurately aligning the pulley and fly-wheel in the first place, and then by maintaining that alignment. The belt should be properly treated so that it will always be soft and pliable with a high friction coefficient. High "drumstring tension" should not be tolerated, because unnecessarily high tension increases the bearing friction unnecessarily, is hard on the belt, causes premature wear in the journals, and also requires a wider and more costly belt. A properly

cared-for belt will permit slack or easy running. The belt will operate with a larger arc of contact, and there will be less danger of slip than with tight, uncared-for belts. A good rule to remember is this: each per cent of slip of the main belt costs one per cent of the annual fuel bill. Thus, if the average belt slip is 3 per cent, the annual cost of that slip is 3 per cent of the annual full cost. Hence it is often possible to save hundreds of dollars annually by giving the belt a few dollars' worth of extra care per year.

Belt-driven generators, therefore, need not be avoided, but if selected they should be carefully operated. There are a great many belt-driven generating stations that could be vastly improved by improving the belt. Direct connection to the generator, of course, avoids all belt troubles.

Ornamental Bridges Beautify City Parks



AN ATTRACTIVE AND WELL-LIGHTED BRIDGE IN A PARK IN PORTLAND, MAINE

The Arkansas Road Finance Situation

By **Thomas H. MacDonald**
Chief, U. S. Bureau of Public Roads

EDITORIAL NOTE.—*The following statement was prepared by Mr. MacDonald specially for THE AMERICAN CITY to place the situation clearly before state, county and municipal officials.*

ARKANSAS is the only state in the Union that has attempted to finance road improvements through the special assessment district plan alone. All other states provide either state or county revenues which, by widening the taxation areas, spread the cost to those benefited more equitably than is ever possible in special assessment districts. The situation with reference to road conditions is entirely local, and such Federal Aid projects as have been approved for the state are notably free from serious conditions which have outcropped in some districts in the state.

Of 96 projects which have advanced to the point where the Government is apprised of the details of the laws creating the districts in which they are located, 43 are in road districts created under the Alexander Law, and 52 are in road districts created by special laws. In a number of cases special laws have been enacted for districts created under the Alexander Law, relieving the districts of certain disabilities and altering the conditions of the improvements. One project, which has been completed, was initiated by a county and was not in a road district.

The conditions complained of in articles appearing in the *New York Times* are to be found mainly in the districts created by special local laws. It is generally admitted that the Alexander Law, though not perfect, provides sufficient safeguard to protect the public interest, and to prevent confiscatory taxation. Thus, the Alexander Law provides that the assessments levied shall be in proportion to benefits received and that the total cost of the improvements, exclusive of interest, shall not exceed 30 per cent of the assessed valuation of the property. The right of appeal from the assessments levied is protected, and to establish a district the county court must have a petition signed by a majority in land value, acreage or number of landowners in the territory affected by the proposed district. The proposal to create a district must be advertised for three

weeks, and any property owner has a right to protest against it at any time within thirty days.

On the contrary, it is alleged that in certain special districts the limit on assessments is raised to a practically confiscatory level, that unjust discriminations are made in the law, and that assessments are not always in proportion to benefits on account of special provisions in the laws. The districts are created by acts of the Legislature and not upon petition of the landowners, and the opportunity for appeal against the creation of the district is generally denied. The time allowed for appeal against the assessments is generally reduced to two or three weeks.

Details of the Required Procedure

Though a number of Federal Aid projects are in such districts, the Bureau has not been advised of any injustice which has resulted from the acts in those districts. In every case the legal procedure required by the state statutes and by the Federal Aid Road Act has been followed to the letter. The Federal Aid Road Act made its operation in each state subject to prior assent on the part of the legislature of such state, and provided that the work in each state should be done in accordance with the state laws.

The act of the Arkansas Legislature assenting to the Federal Aid Road Act provided that before any state or Federal money shall be advanced to any road improvement district there shall be submitted to the State Highway Department certified copies of the papers pertaining to the organization of the district; that the State Highway Commission shall submit such papers to some attorney for examination; that if such attorney finds the district to have been created in conformity to the constitution and laws of the state, he shall so certify to the State Highway Commission, and such improvement district shall then be prima facie legal unless suit be brought within ten days.

In line with this provision, the Bureau has required that there be filed as a part of the record in connection with each project a copy of the certificate by the attorney as to the validity of the road improvement district in which the project is located. This Bureau has also required as a part of the record on each project a certified copy of a resolution by the board of commissioners of the district showing that the funds required to meet the district's share of the cost of the improvement are available, a

certified copy of an order or resolution by the County Court approving the action of the district commissioners and agreeing to take over and maintain the road after completion, and a certificate that the project has been approved by the Advisory Board of the State Highway Commission. In addition, the Legislature, by the act assenting to the Federal Aid Road Act, pledged the good faith of the state to maintain the roads improved with Federal aid and to make adequate provision for such maintenance.

Boston to Be a Free Doctor ?

The Truth of the Excellent Work of the Boston Department of Health
and Its Expanding Activities

PAPERS throughout the United States in the last two months have been publishing brief items under column headings similar to that at the beginning of this article. In order to ascertain the exact conditions of affairs, THE AMERICAN CITY corresponded with Dr. William C. Woodward, Health Commissioner of Boston, and has secured the following letter which explains in detail the most interesting and excellent work which this department is now taking up to make more effective the health department in coöperation with the various agencies for health promotion:

TO THE EDITOR:

Your letter has been received, asking information concerning "the plan for giving free medical advice to the citizens of Boston," which plan you have seen referred to in the newspapers. The announcement concerning the project was prematurely made.

The Boston Health Department does not plan to establish a clinic for the treatment of disease. Neither does it plan to enter into competition with the "health editors" of the newspaper press in giving advice to correspondents or callers relative to the treatment of particular cases. The purpose of the Department is to keep itself informed as to the resources of Boston for the pre-

vention, relief, and cure of disease and disability, and to advise those who apply to it for information as to where they can best obtain the aid they need. As an incident to such service it will doubtless be necessary at times to state frankly to inquirers that the cases presented by them do not present any evidence of conditions that should give any concern or call for the seeking of medical advice; to advise, possibly, regimens designed to remove faulty habits of living as disclosed by the inquiry; and to suggest that an effort be made to remove the condition complained of by correcting faults in habits of living before seeking medical advice and treatment. Even the giving of such advice as to regimens is, it should be clearly understood, an incident to the general purpose of the Department, to expedite and facilitate the putting of persons in need of medical advice in communication with physicians in private practice or connected with institutions best fitted to give such advice.

What the outcome of the undertaking will be cannot be predicted at present, as the Department has had no experience that would justify it in expressing any conclusion.

WM. C. WOODWARD,
Health Commissioner.

General physical examinations of school children, between now and the end of the school year, are being urged by public health authorities.

Such examinations are particularly needed where children are failing in their school work. Parents, where possible, should let the family physician make a thorough physical examination, the school physician attending to the remainder.

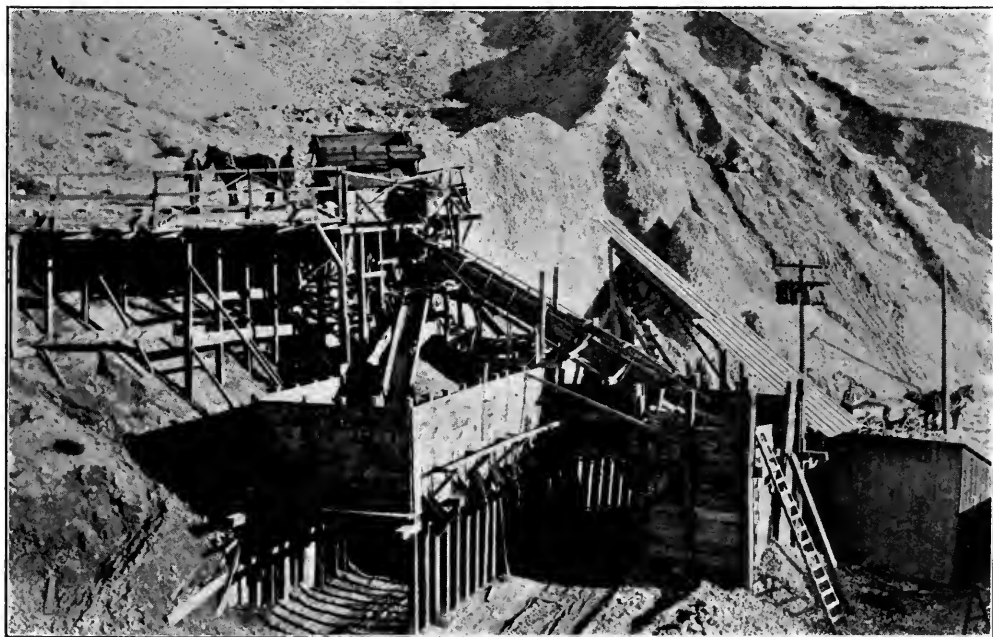
The Municipal Gravel Pit of Salt Lake City

By P. T. Burton

Commissioner of Streets and Public Improvements, Salt Lake City, Utah

AS a means of reducing the cost of material for maintaining the dirt streets of Salt Lake City, the Department of Streets and Public Improvements began several years ago to develop a gravel pit which is located about $1\frac{1}{4}$ miles from the main district of the city on a paved asphalt street. The plant was built in sections by the Department, but no extensive operations were undertaken until 1920, when

there is an equal amount of gravel available underneath the level at which it is now being worked. A tunnel measuring 8 feet high by 12 feet wide and timbered by 12 x 12 material was driven into the hill. The bank is so loose that it is necessary to use lagging, both on the top and sides of the tunnel, and sets are put up about $2\frac{1}{2}$ feet apart. At the present time the tunnel has been driven approximately 90 feet into the



A SCENE AT THE GRAVEL PIT OWNED AND OPERATED BY SALT LAKE CITY, UTAH

the writer, realizing the possibility of making the pit one of the best in that section of the country, conceived the idea of tunneling into the bank of sand and gravel above the level of the present screening plant and crusher. There were not sufficient funds available to modernize the screening plant itself, so this method was decided upon.

The deposit above the level of the present screening plant and crusher is from 75 to 100 feet in thickness and extends back into the mountain for $\frac{1}{4}$ of a mile. The deposit has been prospected, and it is known that

bank, and loading stations established at intervals of about 20 feet.

Intensive operations began in September, 1920, and thus far between 350 and 400 yards are loaded each day through the use of two of the loading stations. A third was opened up about the first of March. The method of operation involves the use of men with long bars, jabbing into the hill and caving down the material, often as much as 200 yards at a time.

The screening and crushing plant, working to capacity, handles from 350 to 400

yards a day, but the car equipment used at the tunnel is capable of handling at least 50 per cent more per day, these figures being for 8-hour shifts. The cars used in the tunnel carry from 4 to 4½ yards and are handled with one horse. The crushed material from the larger boulders is used for the base of the gravel surface, and the finer material at the top, and when thoroughly rolled it makes a very desirable

gravel road.

The old method of handling was with teams and scrapers which cost about 62 cents per yard to operate. The present method costs 22 cents per yard. With this method of handling, it has been possible to put gravel onto the streets, averaging the work which is done within the city limits with hauls from 1 to 7 miles, at a cost of about 92 cents per yard.

Native Trees in City Streets

By Frank A. Waugh

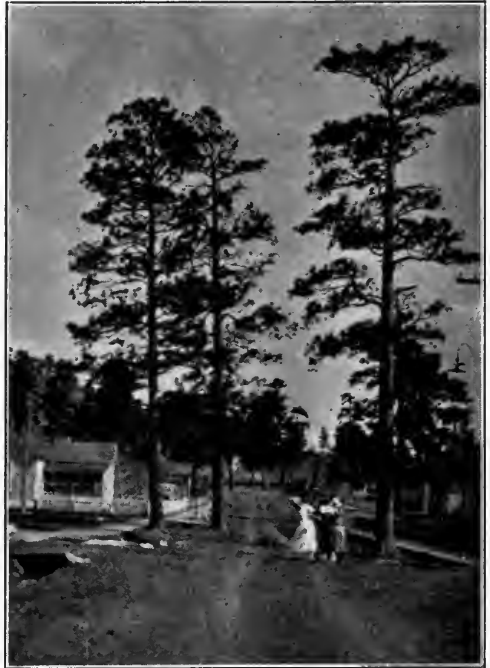
Massachusetts Agricultural College, Amherst, Mass.

IT has long been the practice of landscape architects in designing expensive suburban subdivision properties to play up the native trees on the land. Streets have been diverted and lot lines modified to make the most of fine old elms, oaks, hickories, and other species. It is a pity this practice is not more widely followed. It is perfectly available even in the wildest and newest western towns where the city engineer lays off all streets on the checkerboard plan and runs them out with a transit.

The accompanying illustration shows an excellent example from Flagstaff, Ariz., where numbers of splendid western yellow pine have been saved in the straight streets. Some of the groupings are exceedingly picturesque, and they go a long way to make presentable the raw new streets.

It is to be regretted that native shrubbery and trees of small growth cannot be saved in a similar manner. There are many places where large masses of sumachs, dogwoods and wild roses might be preserved, at least for many years after opening up new sections of towns and cities. Where curved street lines are used and laid to the natural topography, there is absolutely no excuse for removing the native growth of this sort. On the other hand, preservation of such

native growth would tend to enhance the park-like character suggested by the topographic streets.



NATIVE YELLOW PINES IN THE STREETS
OF FLAGSTAFF, ARIZ.

Proper Economy in Health Budgets

In this emergency it behooves the conscientious health official to find a way to retrench without impairing existing and necessary functions. If money is not available for all the activities previously undertaken, then each activity should be carefully and separately evaluated. Only such work should be discontinued as will result in the least harm to the general health pro-

gram, or as may be temporarily suspended without losing all that has been accomplished. Just what is or is not essential to the protection of life and health should be judged only by health officials themselves. On them should and must rest the responsibility of determining where the saving can best be made.—*Health News*, New York State Department of Health.

Fire Houses in Australia

Adequate Quarters Provided in Brigade Stations for Families of Firemen

THE welfare of fire department personnel receives far more attention in Australia than is given to it in the United States or Canada, where the comfort and living conditions of the firemen have commonly been given comparatively little consideration. Harrie B. Lee, Chief Officer of the Metropolitan Fire Brigade, Melbourne, Australia, has given some interesting data in his report relative to the type of stations now being constructed in that city.

Married firemen live with their families either in the fire station itself or in separate cottages immediately adjacent. Melbourne's new No. 2 fire station makes comfortable provisions for twelve married men and their families all under the same roof, as well as providing quarters for single men and recreation rooms for general use. This station has four large doors for apparatus and two smaller entrances at either side for entrances to the living quarters. The building is three stories high and is constructed of brick and concrete. It contains twelve sets of quarters, six having four rooms, four having three rooms, and the remaining two, five rooms. There are also four single rooms for the use of unmarried men. Each set of quarters receives ample daylight from light areas. Each set of quarters has its own private entrance, there being a passageway on each side of the station, each common to six sets of quarters. Entrance to the several quarters is by way of staircases. This allows visitors to reach the men's homes without in any way trespassing on the station proper. To enable the men to turn out quickly, each set of quarters has a door which opens onto a gangway leading to poles, down which the men slide to the ground floor immediately behind the engine room.

The quarters are equipped with all modern conveniences. All kitchen and other refuse is deposited in air-tight bins, the

contents being burned in the furnace connected with the heating apparatus. In this station twelve married and five single firemen are housed, in all forty-five people, including women and children.

Another station, the South Yarra, has accommodations for a smaller number of families in the fire house, but, being located outside of the congested-value district, has space adjacent to the station for individual cottages for the firemen. These cottages are owned by the men. Quarters are provided in the building for one officer and two firemen with their respective families.

Signal System for Watchmen

As a means of checking up the efficiency of the watchmen in various buildings throughout Melbourne, there are, in addition to the numerous street fire alarm circuits, about 40 direct lines to various important buildings, such as the Government Stamp Offices and the King's Warehouse, where the materials for the manufacture of notes, money orders, etc., are stored, and many private firms. In most of these premises a watchman's clock system is installed. All being well and the watchman doing his duty, there is no alarm, but should the watchman fail in his rounds, fire department headquarters are at once notified by the opening of a particular circuit. The watchman is immediately called on the telephone, and if he fails to answer, a motor hose wagon is sent out to make inquiries. A similar device is in operation in the watchroom at the station. This has a five-minute check with a one-minute warning bell. Should the duty man neglect to press the button which is conveniently situated on the switchboard, within six minutes, a general alarm is rung through the building, when the whole staff turns out and the reason for the neglect of duty is ascertained.

ACKNOWLEDGMENT.—Prepared from material published in the *Quarterly* of the National Fire Protection Association, July, 1920.

The country never needed FIRE PREVENTION more than it does TO-DAY. If your municipality is not prepared, get busy!

Common Sense in Drug Control

An Intelligent Analysis of Conditions for the Consideration of Municipal Officials

By Paul W. Kearney

Formerly Assistant Director, Government House, Department of Public Affairs,
New York University

THE narcotic drug problem has been treated by a great many people in a great many different ways. While we have all contradicted each other as to whether the drug addict should be pitied or blamed, helped or restrained, handcuffed or X-rayed, we have customarily been unanimous in the result attained—failure. To look over the field and see the vast numbers of reformers, doctors, policemen, judges, legislators and moralists who have attacked the problem, is equivalent to resigning one's self to the conclusion that the only group interested who have accomplished any consistent profits are the charlatans and peddlers!

The question of the proper solution of the drug problem has been mingled with so many side-issues that the basic principles have, in the final analysis, been fogged. As a consequence, the narcotic problem is more terribly vital to-day than it ever was before science and pseudo-science got busy, and the crying need of the hour is the demand for intelligence and common sense in the handling of the issue.

Science has emphatically disproved the old-time theory that drug addiction is a "vice, habit, pernicious appetite, or vicious craving." It has been, and is still, tabulated under those various headings through one of the most serious blunders ever made. For years it has been accepted that the intoxicating sensations to be gotten from the drug constituted the real reason for what we misnamed a "habit." The more progressive element in modern life knows that to be a grave injustice. *The drug addict is a sick man*, ravaged by a terrible poison that has wrecked his whole system. Even with the most admirable will power in the world, he is unable to stay off his drug, in the vast majority of cases, until the need for the narcotic has been removed. It is not a case of breaking a habit but a case of curing a disease.

Proofs of the Modern Theory

While we are unable to coax from the supporters of the "habit" idea any evidences actually supporting their theory, we find the exponents of the addiction disease principle chock-full of unanswerable facts.

In 1897 Dr. Gioffredi, the famous French physician, published the results of his opiate experiments on animals. About the same time, and independently of each other, Dr. Hirschlaff and Dr. Valenti were making similar experiments with dogs, rabbits and mice in Germany. The substance of their findings was this:

A dog, or any other animal, after having been subjected to large doses of opium or of any derivative such as morphine, heroin, codein, etc., for a period of several months, would display signs of horrible suffering as soon as the drug was removed. His muscles would twitch, he would sweat; severe cramps would knot his vitals, followed by purging and vomiting. Without going any further, it is easy to see that the condition responsible for such symptoms is hardly "appetite" or "craving." The same evidences of suffering experienced by a human addict when the drug is removed—often ending in complete collapse, death or suicide—cannot sensibly be attributed to "desire."

Gioffredi, Hirschlaff, Valenti and their contemporaries made another experiment: They withdrew some of the tortured animal's blood and injected it into the veins of a perfectly healthy beast that had never been in contact with opiates. Almost instantly the healthy dog assumed the same "withdrawal symptoms" that were killing the first. The logical question is: can you transfuse a craving, or a desire, or a habit with a tube-full of blood? The logical answer is that you cannot. The second animal suffered because in the blood of the first was a toxin created by the presence of an opiate and to which the opiate itself was the only antidote.

The opinions of dozens of other authorities, arrived at in various ways, substantiate the original conclusion. In New York, Dr. Ernest S. Bishop, Clinical Professor of Medicine at the Polyclinic Medical School, arrived at the same verdict after the observation of hundreds of addicts in this city. In Jacksonville, Dr. Charles E. Terry, then health officer, supervised the treatment of more than 800 addicts and formed the identical opinion shared by these other thinkers. Dr. Jennings, in Paris; Dr. Faust, in Germany; Drs. Pearson, Petty, Lasse, Swords, Dowling, Davin, Fisher, Wilcox, Sladen, Braun, Pryor, Whalen, Van Kleek, and a hundred others in this country, are unanimous in their approval of this principle. Backing them are such publications as the *Medical Record*, *American Journal of Clinical Medicine*, *Illinois State Medical Journal*, *Medical Times* and many other independent medical papers. Governor John A. Parker of Louisiana, former Deputy Commissioner B. C. Keith of the Internal Revenue Service, Judge Cornelius Collins of New York, Senator George H. Whitney, also of New York, and many other public-spirited gentlemen who have had opportunity to look fairly into every phase of the problem, are unquestionably in accord with the findings and recommendations of the more progressive element in medicine.

A Disease, Not a Vice

Heretofore the general and very dangerous method of curing drug addiction was to simply take away the drug. It was done either suddenly or gradually, but usually forcibly in either event. Routine treatments and specific cures were conceived with more rapidity than intelligence—all based on the mistaken belief that as long as the addict was "off" the drug he was cured! On the basis of their awful mistakes, these people formed the present shape of public opinion about the drug addict.

Drug addiction, speaking of opiate addiction and *not including cocaine* or opium smoking, is a definite disease easily controlled and cured by clinical practice when thoroughly understood and when handled in each case as an individual subject. Continued presence of opium or any of its derivatives creates a poison in the system that upsets the function of every organ and tissue of the body; causes intense physical agony and frequently results in breakdown

or death unless checked by one of two things—more opium, which is an antidote to the poison, or the complete eradication of the poison itself, which is a simple task when understood. Withdrawing the drug alone is not a cure for the disease—it operates to the contrary end by allowing the poison to gain ascendance in the body. Most drug addicts—95 per cent of them, perhaps—are innocent addicts; that is, they contracted the disease through ignorant contact with the drug and are not voluntary addicts in any possible sense of the word. The underworld type of addict represents not more than 5 to 10 per cent of the total—the total in the United States being estimated at 2,000,000 as a minimum—and even they contracted the disease under the old impression that it was merely a happy pastime culminating in nothing more than a "habit."

The concern of the public official in these findings is important. The many attempts to control the drug evil by legislation have succeeded only in making illicit traffic more universal and more profitable. Ever since the enactment of the Harrison or Federal Narcotic Law, peddling has increased, until, as Secretary McAdoo's investigating committee pointed out, it now is equal to the legitimate sale of narcotics. In states and municipalities other regulations have been enforced which complicate the matter and render it even more serious. The legislator passes laws making it more difficult for the honest sick to get drugs; the cure-all quacks force interpretations of those laws which operate against the honest doctor and the unfortunate addict to the benefit of hundreds of unscrupulous institutions, and, with the real nature of the malady purposely ignored, it would seem that everybody with authority tries to enforce the laws that have done nothing but exploit the addict for the benefit of the blackmailer.

New Orleans Has Acted Intelligently

There are, to be sure, exceptions to this rule. Let us look into the operation of the Louisiana Board of Health—a modern organization that has approached the topic intelligently.

The state of Louisiana, doubtless feeling compelled to adopt some action with reference to drugs, considering the popular attitude, enacted a law aimed at the better control of the traffic. The enactment cut off the drug supply at its source, and should

have, were the old theories correct, prevented all further trouble. What it did, however, was to *start* trouble!

Dr. Marion W. Swords, Secretary of the State Board in New Orleans, was the man on whom the brunt of the outcome fell. Using Dr. Swords' own words, "an avalanche of human misery" buried him upon the enforcement of the regulatory law. Hundreds upon hundreds of addicts—for the greater part men and women in the best walks of New Orleans life—found themselves suddenly deprived of the one thing on earth they needed to keep body and soul together. As soon as their supplies were exhausted, the poison began to work and they were torn to distraction with their suffering. Observing these conditions with an open mind, Dr. Swords sensed the need for quick and constructive action.

His first move, although it struck horror into the minds of many folks, was a master-stroke that saved the situation. He purchased a large quantity of narcotics from a wholesale drug house and sold it to everyone whose condition testified a need for treatment! The price was only 10 per cent more than the actual cost, yet the net moral results of the plan greatly overshadowed the immediate financial saving to the addicts.

Its instantaneous effect was the squashing of illicit peddling. As soon as the state law went into action, the underground traffic started on a large scale. This will always be true. The addict, because he is a poisoned man, and because the opiate is an antidote to the poison, *must have the drug* until his disease has been cured by the withdrawal of the drug under intelligent clinical management and advice. If the law prevents him from getting it legally, he must then get it illegally. Putting a bill through the legislature is no manner in which to stop the *need* for a drug! That has been proved in every locality where strict regulations have been heedlessly enforced.

The most recent example is in New York, where underground traffic now exists in enormous proportions. A panic was feared by some when it became evident that new restrictions were to be imposed, but the officials in charge constantly pooh-poohed the thought as impossible. Now, however, we can see considerable significance in the fact that the papers continually report raids on peddlers actuated by those self-same officials. Obviously, the underground traffic

does exist in tremendous proportions, and their former statements were prompted by misguided, purely hypothetical optimisms, and ignorance.

No such thing happened in New Orleans. The man who needed narcotics first convinced the medical authorities that he did, through the medium of expert clinical examination—an item neglected in most other cities—and then he got what he required without any of the disgrace and ignominy attached to that procedure elsewhere. The peddler found that he could not compete with the state's price, so he deserted New Orleans for vicinities where he could ply his trade with the inadvertent coöperation of the authorities.

Meanwhile hundreds of sick addicts were being given the best medical attention, and every precaution was taken to guard the confidences these people placed without restriction in the hands of Dr. Swords and his men. Two physicians and a nurse worked on the job. A dispensary was equipped and divided into four sections, for black and white males and females. A confidential record was kept in a book never in any one's hands but Dr. Swords'; no elaborate registration system was used, such as has failed in New York, for it was even made possible for the addict to get his opiate under a *nom de plume*, provided he kept the same name all the time. This was easily checked back through the signatures and other incidental information. In New Orleans there was no finger-printing and photographing of the addicts; no long waiting lines pointed out to sight-seers from rubber-neck cars; no duplicate card forging; and none of the other disgraces so common to the old-fashioned method. The addict there is treated as a patient and not as a subject for publicity!

On such a sensible foundation did the Louisiana Board of Health operate. The clinic was founded on these principles:

1. We realize that a permanent cure of those afflicted with drug-addiction disease is impossible, in the great majority of cases, unless the addict be placed in a position to secure scientific treatment. The sole object of this dispensary is to relieve suffering until such time as a scientific treatment may be had.

2. The basis of operation is legitimate supply *versus* illegitimate trafficking.

3. To prevent a victimized people from being more thoroughly victimized by heartless, profiteering ghouls. To prevent the making of new addicts.

"4. Diminishing petty thievery, which constitutes a tax or burden on society, for the reason that many addicts, unable to pay the price of from \$1 to \$3 a grain, are forced to criminal methods."

Valuable Results

Dr. Swords aptly summarizes the outcome in these words:

"Temporary relief of addicts at a minimum cost. No new recruits through this dispensary. Petty thievery diminished among the lower class of addicts. We have made economic assets of many who formerly were human derelicts. We have made happy mothers and children by enabling fathers and husbands to keep honestly employed. We have raised the morale of addicts so that they no longer wish to steal since the actuating motive has been removed. We have surrounded the high-type addict with security and protection, and concentrated and segregated the principal offenders in petty crime. All of this has been accomplished at no cost to the State Board of Health."

Especial attention is called to that last phrase—"at no cost to the State Board of Health." In itself that is a remarkable accomplishment. They not only got enough money from their small profit of 10 per cent to pay expenses, but they also managed to create a fund of several thousand dollars which has been put into facilities for the study of the disease! Considered together with that unforgettable fact that it also eliminated the peddler, the genuine value of Dr. Swords' original master-stroke is seen at a glance. The citizens of New York State have paid at least a million dollars toward the same end—and the result is the creation of new police deputies made necessary by the growth of illicit trafficking. No one has yet mentioned the cost to society through the inefficiency of our 300,000 addicts, their economic loss and the toll in actual life! Nor has anyone gone behind the face figures and found out the elements implicated in the traffic!

We find no such outcome in New Orleans, nor in any of the other cities where common sense has been used in drug control and treatment: in Jacksonville, Fla.; Shreveport, La.; Los Angeles, Calif.; Harrisburg, Pa.; Memphis, Tenn. All those communities are operating on the identical basic principles established at New Orleans by Dr. Swords, and it is interesting to observe that in most of those cities the operating principles were discovered by men who worked independently of the Louisiana physicians.

Futility of Routine Specific "Cures"

Other facts helpful in the treatment of this subject were learned by Dr. Swords. One is the worthlessness of the routine cures so conspicuous in the methods of cities that have failed to cope with the narcotic problem. Forcible reduction can be successful only in an insignificant number of cases and those only in an early stage. The medical profession is pretty solid in its condemnation of these popular panaceas. The Special Narcotic Committee appointed by William G. McAdoo when he was Secretary of the Treasury (Congressman Henry T. Rainey, Chairman), reported in June, 1919:

"There are numerous forms of treatment for drug addiction, none of which appear to have been given a thorough trial by the medical profession as a whole, or to have received the unqualified support of those members of the profession who have no financial interest in the matter."

An extract from the report of the Joint Legislative Committee for the Investigation of Habit Forming Drugs, New York State Senate, dated December, 1917, in *American Medicine*, reads:

"Evidence from physicians was adduced which denied that any cure for narcotic drug addiction existed in any of the private or public institutions of this state."

And, in another portion:

"... this necessity in turn, your Committee finds, has apparently contributed to the existence of many unsound nostrums and many private institutions where this disease is purported to be cured which exist merely for the purpose of preying upon the addict."

The West Side Physicians' Economic League, as far back as 1916, investigated the problem and reported to the Federation of Medical Economic Leagues, this line, among others:

"There is not and cannot be a routine specific treatment for narcotic drug addiction."

The report was approved by the Federation. Dr. Charles E. Terry tried the leading "cures" in his work at Jacksonville; Dr. Swords looked into them at New Orleans; Dr. Frank J. Sladen tried them at the Henry Ford Hospital in Detroit—each of the three reported them "dismal failures." The Society of Medical Jurisprudence—in fact, many scores of leading physicians have in-

vestigated them and found them sadly lacking value. None are less emphatic than Dr. Swords, who says:

"The 'reduction treatment' is much discussed. In our opinion it is a fallacy pure and simple. The 'hot shot' and other forms of treatment are empirical and not based on scientific knowledge. Some are effective, no doubt, in individual cases, but this obtains in only isolated cases and must not be confused with the entire problem of addiction-disease. The 'forcible reduction' treatment will do more harm than good, and is worse than no treatment at all."

The obvious conclusion is that your city, if it has not already joined the progressive ranks, should remain at a safe distance from the advertised cures when it does start to deal with the narcotic problem.

The complexity of the problem is always aggravated by the existence of restricting laws. The Harrison Law was simple in intent, but its various interpretations wrought evil. Other supplementary enactments in individual states were well meant but disastrous in their operation when the uninformed administrators arrived on the scene.

"Forcible control," says Dr. E. S. Bishop, in the *American Journal of Public Health* for January, 1921, "is a fundamental error. The existing laws make it hard for the physician to know where he stands in his treatment." From that same paper we have

a report from the Habit Forming Drugs Committee* of the Public Health Association, saying in part:

"Measures to restrict the use of narcotic drugs by purely forcible means have in every instance, so far as your Committee can ascertain, failed of their purpose, and furthermore, where restrictive measures have been drastic or rigidly enforced, the illegitimate traffic in narcotics has for obvious reasons increased."

There is a vast deal more to be said—a ten-volume set of books could be written about narcotic addiction and its treatment. The sole idea behind this article is the hope that it will inspire further research and thought on the subject. After the issue has been placed before you in its true light and accepted at its face value, you are welcome to form your own conclusion. In nine-and-a-half cases out of ten the independent thinker will adopt the issues of Dr. Marion W. Swords, master of the situation in New Orleans, and recently publicly honored for his work by Governor Parker of his state.

Common sense study is the only hope for solution. In the words of State Senator Whitney, of New York:

"We ask the coöperation of the physicians, the pharmacists, the health department, the police department, and all public-spirited citizens in a united effort to save the city and the state from the evils of drug addiction, the cause of which is *ignorance*, the effect of which is *misery*, the remedy for which is *education*."

* This committee, which reported before the Food and Drug Section at the New Orleans meeting in October, 1919, included the following personnel: C. E. Terry, M. D., Ernest S. Bishop, M. D., Oscar Dowling, M. D., and Lucius D. Brown, Hermann C. Lithgoe, a member of the committee, dissented from the report. No formal action was taken by the Section one way or the other.

At the San Francisco meeting of the American Public Health Association, held in September, 1920,

a resolution was adopted recognizing the wide variance of opinion as to the nature of narcotic drug addiction and the consequent difficulty in formulating a working program for the control of this condition, and authorizing the appointment of the committee to make a thorough investigation of the subject and to report at the next annual meeting in November, 1921. This committee includes Dr. Roger Perkins of Cleveland, Ohio, Dr. George W. McCoy of Washington, D. C., and Dr. Peter H. Bryce of Ottawa, Ontario.

A Community Hospital Is a Necessity in Every City

Every community, upon the vote of its citizens, should be permitted to build and maintain a community hospital. Already eleven states have enabling acts which permit local communities to build and maintain general hospitals. Such laws should be extended throughout the country. Community hospitals should have one bed for about every 500 of population, each bed to be in a room by itself. Library, X-ray equipment,

and operating facilities should be included in the plan of the hospital. These facilities should be open to every physician of the community for his private patients. The hospital should charge the patient a fee for the cost of nursing, board, and administrative service; but there should be no control by the hospital over the fee of the private physician from the patient. This is entirely out of the realm of the hospital control.

Sewage Siphons for Disposal Works

By Weston Gavett

THERE are various sorts of siphons encountered in sewerage work. In rare cases a true siphon is used to carry the sewage flow over a hill above the hydraulic grade line. "Inverted siphons" are commonly used to carry the flow below the hydraulic grade line when crossing a valley. Sewers may be cleaned by flush tanks operated by siphons. Reaching the treatment plant, the sewage may pass through a dosing tank to intermittent or trickling filters with the dosing apparatus made up of one or more siphons very similar in design to those found in flush tanks. It is this type of apparatus that will be considered in this paper. A more accurate term is "hydro-pneumatic dosing apparatus," but it is easier to say "siphon," and no doubt this name will continue to be used.

The evolution and fundamental principles of these siphons are illustrated in figures 1, 4, 6 and 7. While the facts shown are elementary, the difficulties which it was necessary to overcome in the development of the sewage siphon are indicated. These difficulties are often the cause of failure in the operation of modern siphons. The operator is interested in the ways and the reasons why a device may *not* work, rather

than how well it may function under ideal conditions.

For flush tanks and dosing tanks, the problem is to discharge a tank subject to continuous inflow when the liquid has reached a predetermined level. Discharge should cease when the tank is lowered to another level, allowing the tank to refill.

Figure 1 shows a glass model of a simple siphon, a U-tube with arms of unequal length, with the longer arm projecting through the bottom of the tank. Using a low rate of inflow, the liquid merely overflows down the long arm, and the siphon acts as an overflow weir only. This is the first trouble to be overcome: the liquid should not dribble down the long arm of the siphon, but should start suddenly with sufficient velocity to clear the siphon of air. This can be accomplished with the same model by increasing the rate of inflow as the siphon is about to discharge. The Vibhard flush tank, an old design, shown in figure 2, used this scheme. The water-supply tap was provided with a float that caused an increased inflow at the level required to start the siphon. A mechanical method was used in the Van Vranken flush tank, figure 3. The hinged water-trap at

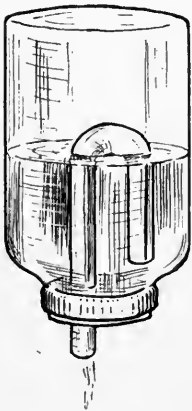


FIG. 1

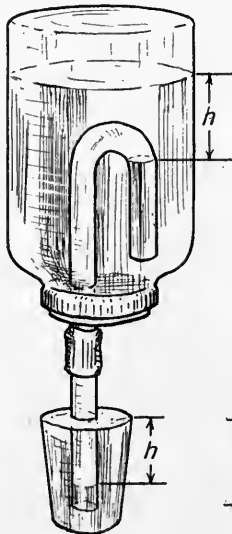


FIG. 4

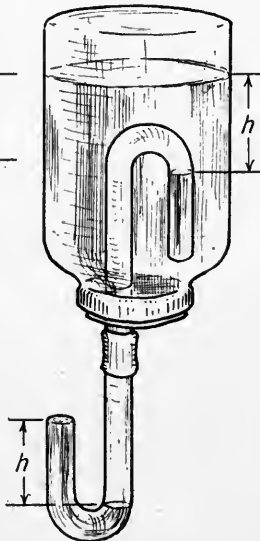


FIG. 6

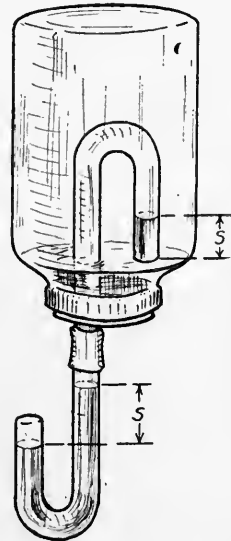
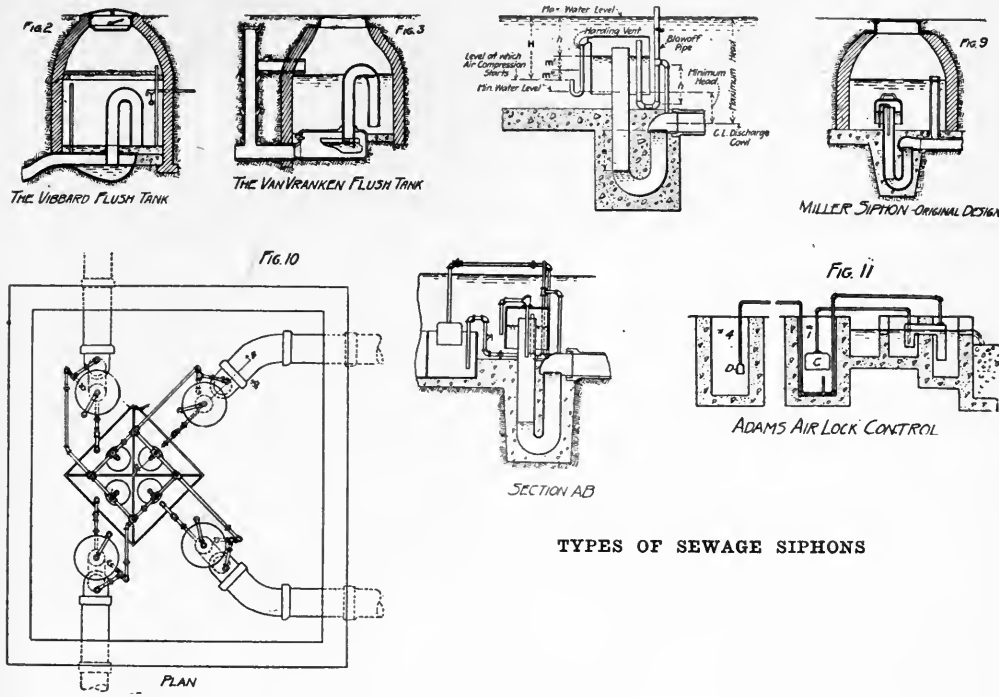


FIG. 7



TYPES OF SEWAGE SIPHONS

the bottom of the long arm allowed a slight head to be built up above the overflow level. The water forced out of the siphon into the balanced trap caused the latter to tip, suddenly releasing the pressure in the siphon and starting the flow.

The Van Vranken siphon suggests using a sump, into which the long arm may project. Trying this with the model in figure 4, we find that a head (h) may be built up above the top of the siphon proportionate to the depth of submergence of the long arm in the sump. This gives the advantage that the siphon, being under a head, is more likely to start. The Merritt overhead siphon, figure 5, is an example of this type, except that a "pilot" or blow-off pipe is added to insure starting, and a vent pipe to stop the flow and refill the siphon with air at the end of discharge. Even with a sump, starting is not certain, as the liquid may overflow slowly into the long arm without carrying out the air. The sump has not removed the first difficulty and has added a second: at the end of discharge, enough air may enter the siphon to stop the flow but not completely recharge the siphon with air at atmospheric pressure. This is shown by the water rising in each arm of the siphon because of a

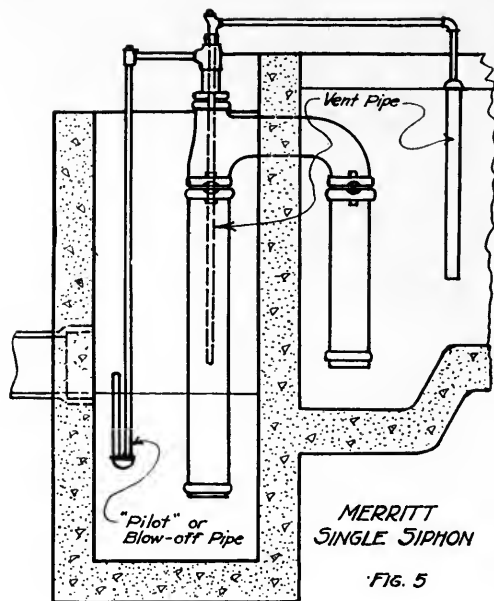
greater pressure outside than inside the siphon. The siphon should be completely vented at the end of discharge.

Substitute another U-tube for the sump in the model, and we have an S-siphon, figure 6. There is an advantage in this type in that the water in the lower trap forced out by the air is not in a position to return. Troubles 1 and 2 are still found in this form, although with small sizes the siphon will start satisfactorily, provided the initial velocity of discharge is sufficient to carry out the air. Difficulty is still found in venting the siphon at the end of discharge, figure 7. If we should replace the upper U-tube with an inverted pot over a vertical riser, we should have the common form of which the Miller siphon, figure 8, is an example.

The above study of the fundamentals has brought out facts summarized below:

- 1 Before starting, the air within the siphon should be at atmospheric pressure.
- 2 The lower trap of an S or submerged siphon should be full of liquid.
- 3 There should be no opportunity for air leakage.
- 4 Special attachments must be provided to start some forms of siphons and to vent or stop the flow in all forms.

In cases of faulty operation these self-evident facts should not be overlooked.



Attachments for Starting the Siphon Blow-off Pipes

The blow-off or pilot pipe used for starting siphons is merely an auxiliary trap made up of small piping. The length of this trap is one of the factors determining the discharge head of the siphon. The advantage of the blow-off pipe is in insuring positive operation in starting the flow through the siphon. Only a small amount of water has to be ejected, and this is blown out suddenly, leaving a clear passageway for the escape of the trapped air. Other advantages are the possibility of varying the drawing depth of the siphon within certain limits, and the ease with which the device can be adapted to plural dosing apparatus where several siphons are operated in sequence. Figures 5 and 8.

Attachments for Stopping the Flow-Vent Pipes

Several methods of venting siphons to check flow have been used. On the original Miller siphon design, a second small siphon was used to draw the liquid below the bottom of the bell. Experience evidently proved this unnecessary, as later models show the short arm of the small siphon opening above the bottom of the bell. In later designs for flush tank siphons, the small siphon is omitted and a "sniff hole" used. This is a small hole in the

side of the bell a short distance above the bottom. It functions by admitting air in quantity insufficient to break the flow until the liquid is below the hole and unable to reseal it. All the above types succeed in stopping the flow and refilling the siphon with air, but the rate of flow through the siphon is considerably reduced for a short period at the end of discharge when the vents are admitting air.

Ordinarily this is not a disadvantage, but in cases where the capacity of the siphon is not greatly in excess of the rate of flow to be carried, it is an important factor. The Harding vent, figure 8, is comparable to a blow-off pipe in that a small amount of water in a trap is ejected, or in this case injected, leaving an unrestricted opening for the air. With this vent the flow is stopped suddenly with no previous reduction in flow.

Plural Devices

In treatment plants, it may be desired to dose several units in rotation, to divert the flow from one contact bed to another, or to empty one bed when another has filled or after some desired interval of time. There are a great variety of these devices, often with quite complicated arrangements of air piping, starting bells, etc.

Two siphons of the Miller type will alternate without any auxiliary devices if they are of the same size and are properly set. When the liquid rises in the tank, one siphon will discharge, and part of the liquid in the other will be forced out. At the next filling, this siphon will operate, as its discharge head has been lowered by the removal of liquid from its trap. When more than two siphons are used, auxiliary attachments are required. There are so many arrangements of this sort that they cannot be considered in detail in this article. In general, the method used is to make the siphon that is discharging arrange matters so that the siphon next in line will operate at the following filling. In one arrangement, shown in figure 10, each main siphon is connected by a small siphon to a starting well, which can be a length of tile pipe closed at the bottom. In this well is an air bell connected to the blow-off pipe of the following siphon. When one siphon discharges, it drains the starting well connected to it, leaving the others filled. At the next filling, the extra pressure devel-

oped in the air bell in this starting well is transmitted to the blow-off pipe of the following siphon, causing it to discharge. Another example of a blow-off pipe operated by an air bell, is found in the Adams air lock control for diverting the flow to contact beds. While it is not a siphon, the principle is similar. In this case, the outside water level is constant. The flow is stopped by forcing air into the trap from a large air bell, and the air-lock is broken by a compound blow-off pipe. These examples illustrate the possibilities obtainable with this type of apparatus.

Variation in Head

It is possible to change the drawing depth of a siphon somewhat by variations in the blow-off and vent pipes. The vent pipe determines the level at which air compression starts. The discharge head is above this point. Figure 8 shows the following measurements:

- h—The height of the blow-off trap
- m—The rise due to displacement of water
- m—The rise caused by the compression of the air in the siphon

Operation of Siphons

There is no question that single siphons as now made will operate successfully. With plural installations, the necessity for small piping, valves, etc., that must be airtight, would naturally cause question as to whether they would be as reliable as a single siphon. No doubt this has caused the design of controls using siphons operated mechanically and controls purely mechanical in principle. Letters of inquiry

written to a number of engineers for their opinions and experience with apparatus of the hydro-pneumatic type brought generally favorable opinions. Some advised occasional inspection. One said a plural device worked so well it was boarded over. Another said supervision was necessary, and since this was the case, eliminate the automatic device and give the man on the job something to do. The reasons for failure in operation mentioned were: clogging of small piping; air leakage; freezing in small piping (rare).

Mechanical controls have not been considered. Controls of this type are used successfully, as well as combination mechanical and siphonic apparatus. A large book could be written on the whole subject of controls, so the writer has endeavored to cover only the elements of the sewage siphon. The best way to design a sewage siphon is to collect the necessary data relative to rate of flow, heads, etc., and then let the siphon manufacturer do the designing from this.

In judging or choosing an apparatus, desirable factors to consider are:

Simplicity combined with positiveness of action

Ease of installation and repair

Possibility of repair by attendant on the job, in case of failure in operation

Undesirable factors are:

An excess of complicated piping, liable to air leakage and clogging

Inaccessible piping

Apparatus requiring very delicate adjustment

ACKNOWLEDGMENT.—From a paper read before the New Jersey Sewage Works Association.

The Largest Americanization Class in Pennsylvania



THIS CLASS, NUMBERING 162, HAS RECENTLY BEEN GRADUATED IN SCRANTON, PA. TWENTY-TWO NATIONALITIES ARE REPRESENTED

The Life and Property of Municipalities Are Most Effectively Protected Through Department Motorization

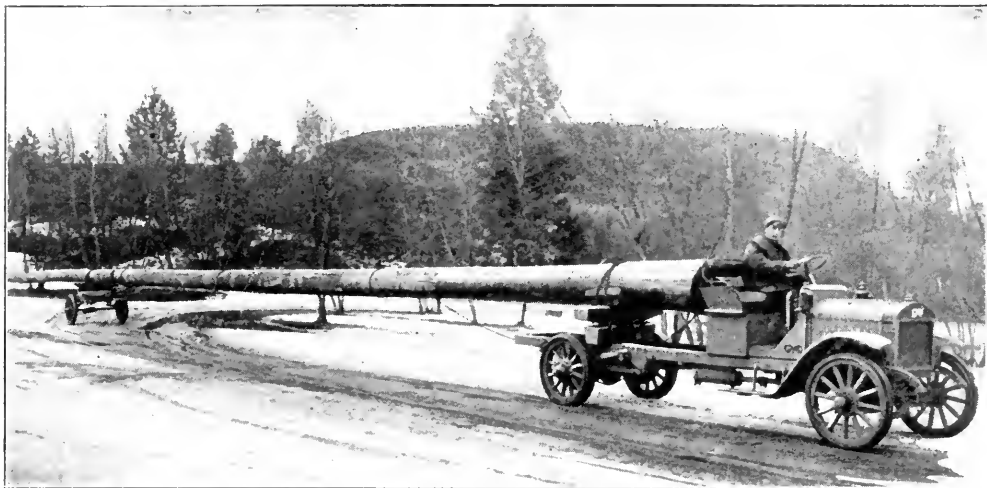


NEW HARLEY-DAVIDSON MOTOR-CYCLES AND SIDECARS RECENTLY PURCHASED BY THE
POLICE DEPARTMENT, DENVER, COLO.

This outfit is known as the Riot Squad. The motor-cycle squads of Denver have done much in the last three years to preserve life and property. In the center of the above group are shown Police Commissioner Downer and Chief of Police Williams

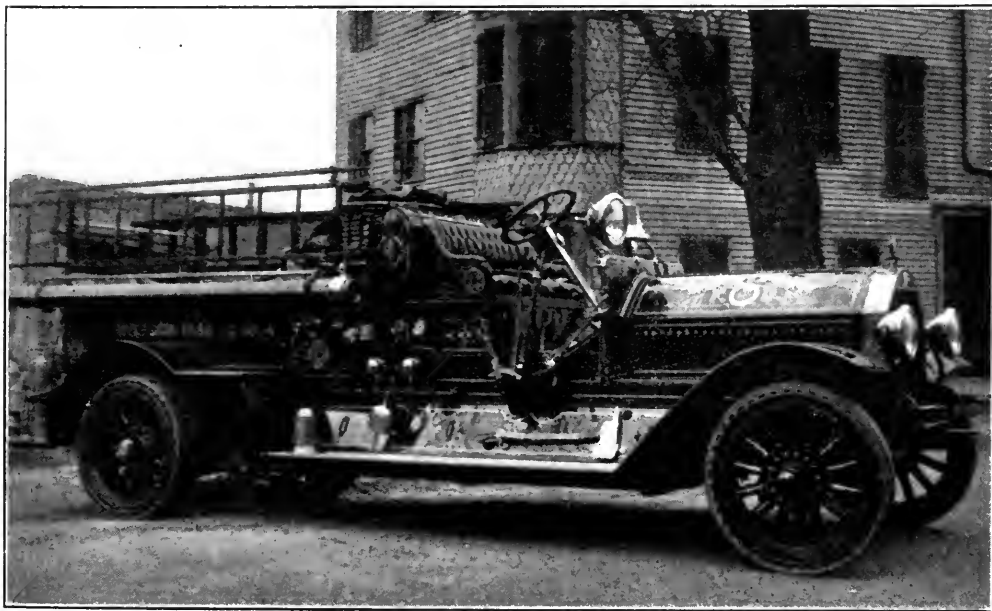


A WHITE POLICE PATROL FOR QUICK SERVICE IN COLUMBUS, OHIO



A 1½-TON GMC TRUCK HAULING A 121-FOOT FLAGSTAFF 90 MILES FROM SANDPOINT TO MANITO PARK, SPOKANE, WASH.

The seconds that are saved by fire department motor trucks are invaluable in checking fire loss, but the safety of the public and the possibility of loss of apparatus through reckless driving must check the needless speed that invites accidents.



THIS SEAGRAVE PUMPER BELONGING TO RIVERSIDE HOSE COMPANY NO. 4, TARRYTOWN, N. Y., RESPONDED TO 23 ALARMS IN THE FIRST SEVEN MONTHS OF ITS OPERATION

At one fire, water was pumped steadily for 7 hours and 50 minutes through 1,350 feet of hose up a very steep hill. At another fire the pump operated on 2 lines of 500 feet each for 4 hours and 10 minutes. The pump is guaranteed at 750 gallons per minute, but delivers nearer 850 gallons. Data furnished to The American City by John J. Herron, secretary, Riverside Hose Company No. 4

The Public School Baths of Baltimore, Md.

A Story of the Fight to Secure the Baths, and the Results Accomplished

By Robert F. G. Kelley

Superintendent, Baltimore Public Baths

FOR a number of years, in its annual reports and by public agitation, the Free Public Bath Commission of Baltimore endeavored to have a system of shower-baths installed in the public schools of the city. As early as the year 1900, with the opening of its first indoor shower-bath house, facilities were provided and efforts were made to encourage bathing among school children. In 1902, a letter was addressed to the School Board, offering to give free baths to any children sent by their teachers at any time. This offer was accepted, and many children were sent.

In its report for 1903, the Commission suggested to the School Board the advisability of establishing in certain crowded sections of the city baths in the public schools, but through lack of finances this could not then be done. In 1904, at the request of the School Board, the Commission prepared and submitted plans for school shower-baths, but nothing was done by the Board to put them into effect at that time. In its report for that year, the Commission stated:

"One of the gravest problems in school sanitation in the larger cities, and especially in schools situated in the poorer sections, has been



BALTIMORE PUBLIC SCHOOL BATHS; PUPILS AT SCHOOL NO. 47 READY FOR THEIR BATHS

not only to keep the schoolrooms in a clean and sanitary condition, but also to secure cleanliness in the dress and person of the children coming from houses which are but poorly provided with facilities for bathing."

Year after year, in its annual reports, the Commission stressed the need of these baths, but was unable to persuade the School Board to install them, until about the year 1913, when ten showers were installed in Public School No. 6 on South Ann Street, a neighborhood consisting of people largely of foreign birth. It was not until the year 1916, however, that these baths were put into use, and then only by the Bath Commission's agreeing to pay all expenses in connection with their operation.

With the cooperation of the principal and her efficient corps of workers, a schedule was made by which each pupil was allowed twenty minutes a week for a bath. Care was taken that the attendants, one man and one woman, should be of the type that would encourage and help the children. From the beginning the baths were a success, and at the close of the school year they were opened for the use of the general public. The attendance was very large during the summer months, and for the first year of their operation over 50,000 baths were given.

After a year and a half of operation, the principal of the school wrote as follows:

"Bathing, an important adjunct to the health, comfort, and happiness of school children, occupies a place on the time schedule of each class in this school. The children go back to their rooms refreshed and alert for work, and no ill effects have resulted. Enormous benefits have been noticed. At first, the condition of some of the children was found pitiful, their clothing soiled and torn, their little bodies unclean. But ere long there was marked improvement. Everyone here is awake to the vital importance of the baths as a means of character building and social improvement. In many instances the good influence has reached into the homes."

The success of the baths in this school was so marked that the School Board installed them in two other schools in crowded sections of the city. These were operated by the Bath Commission under the same conditions prevailing at the initial one, with like results. As an evidence of their great popularity, at these three school baths during the months of July and August of 1920, when the schools were not in session, they were used by the general public to the number of 36,392.

As a further development of bathing among school children, at one of our small portable baths opposite a public school the experiment was tried of closing it during school hours to the general public, and using the same plan pursued at the school baths, of allowing the children twenty minutes each week for a bath. This plan also was successful, and at least 75 per cent of the pupils used the baths.

Our experience at this school showed us that it was possible for the children to leave the school building and bathe without disarranging the school schedule, providing the distance was not too great.

Acting on this, the plan was given a further trial at another of our schools. This school, an old one, but with a principal and a corps of efficient assistants who, under many handicaps, have been working along modern lines, is located in a section which has few bath-tubs, and the children come from homes where they have not been able to receive much personal care.

Two portable baths with seven showers in each were erected on a lot in the rear of this school, and a schedule was arranged by which each pupil could bathe at least once each week. The results here were very satisfactory, and at the present time in an enrollment of over 900 practically all are using the baths.

The principal of this school recently wrote us as follows:

"Since your portable houses have been in operation, the children in this school have been decidedly cleaner. We think they are giving us better general school work. We also believe that the baths are reacting on the general health of the children. The baths prove to be as necessary to a school as to a home. I hope no school in which I work will be without them."

For the year 1919, at two of the schools and the three portables mentioned the total attendance was 159,966 persons, a large proportion of whom were school children.

Aside from the beneficial effects derived from the mere matter of cleanliness, a very important feature of the work at the school baths, which has developed through the interest taken by the attendants, is a general inspection of the physical condition of the children patronizing the baths. The attendants have taken a deep interest in this phase of their work, and have rendered a very valuable service to the community by personally treating minor abrasions or erup-



A GROUP OF BOYS WAITING FOR THEIR TURN AT PORTABLE BATH NO. 1, BALTIMORE, MD.

tions of the skin, and, where conditions are too serious for them to take the responsibility, by seeing that proper treatment is secured for the children at the hands of family physicians or at public dispensaries.

The average number of cases treated at each school has been about 1,200 a year. In many instances children have been taught the proper way to wear their clothing and to keep it in repair. Many cases of destitution have been relieved which would not have been known had it not been for the baths.

We feel that the remarks made by Dr. Baruch, President of the American Association for Promoting Hygiene and Public Baths, in his address at the Baltimore Con-

vention in 1916, on "School Baths," cover our experience:

"Baths exercise a vital influence indicated not only by the appearance of the little ones, but by their alertness in study after the bath.

"The children return to their classrooms more refreshed and alert for work than they would after a half-hour's exercise in the gymnasium. We believe that the bathing habit formed in school will continue through life.

"On the moral side, a child when clean has more respect for himself and is more responsive to law and order."

In conclusion, we would emphasize the importance of selecting proper attendants for the work, as much of its success depends on them.

ACKNOWLEDGMENT.—From a paper presented at the annual meeting of the American Association for Promoting Hygiene and Public Baths, 1920.

It Will Interest You to Know That—

The State Legislature of Minnesota has passed an enabling act permitting Duluth, Minneapolis, and St. Paul to do zoning under the police power. In St. Paul, a zoning survey is now being carried on by the engineering office of the St. Paul City Planning Board. George H. Herrold is City Planning Engineer.

* * * * *

The New York State housing laws have

been declared constitutional by decision of the Supreme Court in the appeal of the Marcus Brown Holding Company vs. Marcus Feldman, Benjamin Schwartz and other tenants. The Court held that these tenants could not be evicted as the result of the operation of leases made before the passage of the emergency laws. These leases would have automatically ejected the tenants.

News and Ideas for Commercial and Civic Organizations

"Getting It Done" in Kansas City

KANSAS CITY, MO.—The Kansas City Chamber of Commerce, which for some time has been conducting a national advertising campaign in which pertinent facts concerning Kansas City were recorded in newspaper advertisements under the head, "Do you Know?", suddenly stopped advertising the city to ask the reason for delays in certain civic improvements, and substituted a "Get it Done" campaign.

The movement was inspired by the Chamber's New Year's resolution to pick up the loose ends of delayed city improvements and urge their completion. Immediately after the first of the year the organization's Civic Affairs Committee took an inventory of the projects under way or contemplated, in order to determine upon which ones the energy of the movement should be concentrated. There were forty unfinished projects in the hopper and sixteen were selected as demanding first attention. In this, the fourth month since the campaign started, all sixteen are either well under way or ready to be acted upon.

Like many other American municipalities, Kansas City laid the blame on the war. Certain viaducts and boulevards could not be finished because the railroads, which were to bear a portion of the expense of building them, were government-owned. Other war bans were accepted with equal grace, and the city's midwestern restlessness spent itself in oversubscribing every Liberty Loan and war aid assessment levied against it.

The fervor of the national advertising campaign had affected the city's chest expansion noticeably. The reaction came slowly, only after many from the outside had asked, "What's the matter with these streets?", "Why isn't that viaduct com-

pleted?", and "Are gas street lamps a sentimental heritage?"

Perhaps it was the progress that had been made toward the realization of the Liberty Memorial, the art museum, and the civic center that are to be built by the two and a half millions contributed by the citizens that awakened the city to the need of a thorough house-cleaning. Perhaps also civic pride was stimulated when the city, as a result of condemnation proceedings, had acquired some 30 acres of land near the vast Union Station on which to build the memorial.

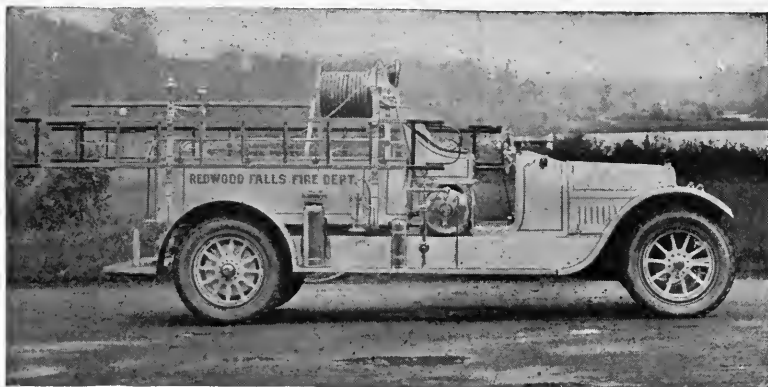
The need of a 15-mile sewer system that will release the banks of a small but pretty river for beautification and development as a park for a fast-growing industrial section was doubtless another factor. And the need



A VIADUCT GAP THAT CAUSED INDUSTRIAL, COMMERCIAL AND CIVIC INTERESTS TO URGE: "GET IT DONE!"

of a viaduct carrying a roadway which will link the two cities of Kansas City, Mo., and Kansas City, Kan., and afford direct access to the stock-yards and the new exposition building was perhaps another. There were needed also five wider, better paved, easier graded traffic-ways to improve travel in virtually every section of the city, as well as a 14-mile boulevard, with a viaduct, and two shorter but equally necessary boulevard links; a free bridge across the Missouri River, and the repair of many badly neglected streets and boulevards. Anyway, a desire to push things through was awakened,

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Under our sales plan you have not only the personal attention of a dealer you know, but also the liberal guarantee and international reputation of Northern Fire Apparatus behind the job.

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Northern Fire Apparatus Co.

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Minneapolis, Minn.

and has been kept awake.

A complete and modern lighting installation, instead of patchwork, for city illumination; a dike for flood protection of a new industrial district; and a move to combat the evil of issuing special permits for ordinance violations, such as overhead signs, parking, and the location of filling stations and shacks within fire limits, completed the program.

The campaign was organized by the Chamber of Commerce, which asked each civic and improvement club and every department of the city administration to name a representative for the campaign committee. The Club Presidents' Round Table; the presidents of such clubs as Rotary and Kiwanis; the Real Estate Board; engineers', architects', and builders' associations and the like, all joined the movement. From these organizations an executive committee of nine was chosen, which elected a chairman.

A chairman and a vice-chairman were "drafted" for each of the sixteen project committees, chosen for their efficiency and not for political reasons, and those officers picked their committeemen.

The "Get it Done" slogan was proclaimed. It was emblazoned in black script upon

parity or value of these notes. After the campaign was started, the banking institutions responded well and work was resumed on many projects which had been delayed because of their inaction. On two projects appeals from the condemnation awards were holding them back. On one of these the civic aspect was explained by fellow-citizens, and all the appeals were dismissed.

The big viaduct was delayed when the street railways went into receivership. They were to have paid part of the cost. The court and the receivers tendered a part-payment plan. That required a new agreement between the city and each of the fourteen interested railroads, but before April 1 the new agreements had been signed and approved, and work was resumed. The lighting bill is in the Council. It will pass. The 14-mile boulevard is being graded, and repair gangs are on the streets. Ten of the sixteen projects are under way. Not one has failed, and not one will be allowed to fail.

No political or social brickbats have been hurled so far. It is interested citizenship at work. The spirit has been fine. The women's clubs have now launched a movement for a solution of the garbage problem. The men have joined them. So has the City Hall. The "Get it Done" slogan has become literal.

Written for THE AMERICAN CITY by
GERALD F. HAGER, of the *Kansas City Star*.



The Chamber of Commerce of Kansas City, Mo.

THE SLOGAN THAT GOT IT DONE

posters and office cards. Windows and desks bore them.

The outstanding causes of delay in the making of public improvements, when boiled down, were found to be objections of abutting property owners to the improvements, with consequent inaction by ward aldermen; lack of funds, or the below-par status of special bonds; and litigation.

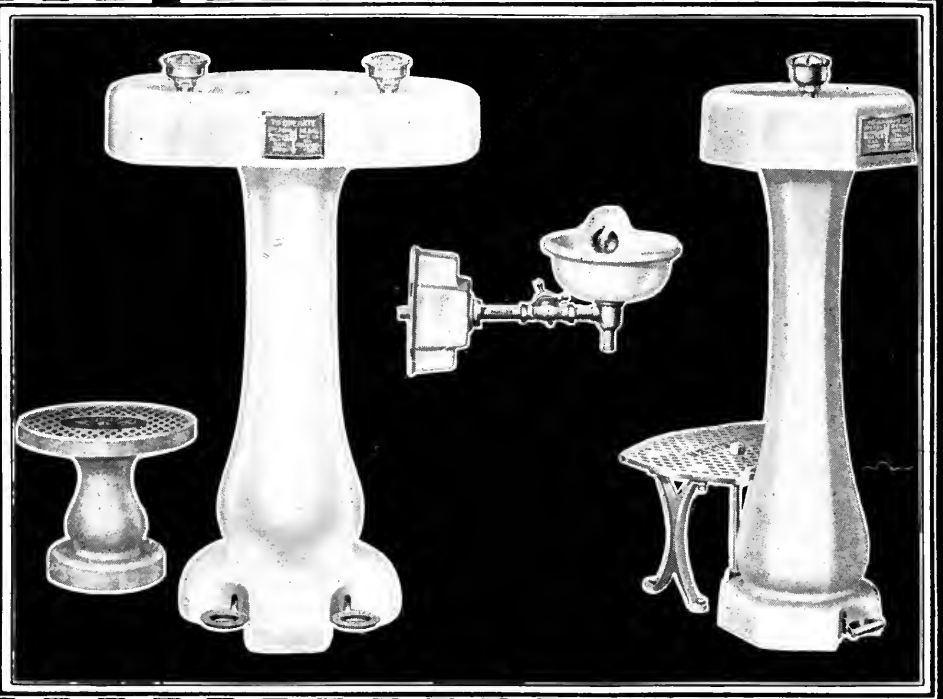
Kansas City has a benefit district system of fixing charges for improvement. Condemnation notes are issued to the owners of the damaged property, and payments are collected from the owners of the property benefited thereby. The banks determine the

Townpeople and Farmers Get Acquainted

ELWOOD, IND.—Considerable headway has been made by the Elwood Chamber of Commerce in the development of good feeling between the townspeople of Elwood and the farmers living within a radius of fifteen miles of the city. The Chamber recently concluded a two-day agricultural course which was attended by several thousand farmers and citizens of the community and resulted in many expressions of good will and mutual confidence.

The course was given in the Methodist Church, and the interest and attendance grew with each session. There was standing-room only at some of the sessions. A spelling contest between two townships brought in the people from those communities, and a program contributed by one farming section drew the entire countryside.

The lectures dealt with the problems of



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There is a **MUELLER** model to meet every need. The three designs here shown—E-3650, E-3758 and E-3632—are all popular styles for parks and public buildings.

Each **MUELLER** Fountain combines the most approved sanitary construction with beauty of design and quality of materials and manufacture. We are equipped to supply special fountains for unusual conditions.

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Mueller Metals Co., Pt. Huron, Mich., Makers of Red Tip Brass and Copper Rod and Tubing;
Forgings and Castings in Brass, Bronze and Aluminum; also Screw Machined Products.

the fruit grower, the dairyman, the stock raiser, the truck gardener, the general farmer, the poultry raiser, the housewife, and the country school patron. Motion pictures on the subject of community building were shown, and demonstrations with the actual equipment were given wherever possible, the other lectures being illustrated with charts.

The object of the course was the betterment of the community, and while the program was general in scope, it was arranged with the farmer and his family principally in mind. The first lectures were prepared especially for school children, on the theory that their reports of the sessions would stimulate an interest in the course on the part of their parents. The "get-together" idea was emphasized in all the lectures.

SHERIDAN CLYDE,
Secretary-Manager, Elwood Chamber of Commerce.

Routing the Rabbit in Colorado

STERLING, COLO.—Coöperating with the County Agent of Logan County, in which Sterling is located, the Sterling Chamber of Commerce recently participated in a rabbit hunt as a means of exterminating the troublesome little animals which are found in such large numbers within the confines of the county and annually consume a goodly share of the grain and forage crops.

The County Agent organized the hunt, and at the appointed day and hour the sepa-



BRINGING IN THE JACKS

rate community organizations moved towards Sterling as the center of attack. More than 4,000 rabbits were taken in the hunt, ranging from tiny cottontails to monstrous jacks, well-fed and active. The communities participating were Iliff, Fleming, Willard, Atwood, Peetz, and Sterling.

Fleming, a town of 500 people, closed the stores and declared the day a holiday. Willard took the prize for the greatest number of rabbits caught per man. The losing team in that town provided an oyster supper for the winners. The game was all transported to Sterling, where it was loaded into a box car and sent to Denver, for distribution among the poor of that city.

The hunt was declared a great success. It is estimated that the gunners used up 2,000 shells during the day's work, and at five cents per shell the drive cost \$100, an expenditure which means the saving of thousands of dollars' worth of grain to the county during the coming year. The hunt will probably become an annual event.

J. J. CUNNINGHAM,
Secretary, Sterling Chamber of Commerce.

Lexington's Advertising Lecture Course

LEXINGTON, KY.—The Lexington Board of Commerce turned to good account a dull period in its activities a short time ago by inaugurating a course of ten weekly lectures on "The Psychology of Advertising." These were delivered by Dr. John J. Tigert, of the University of Kentucky. A nominal fee of \$3 was charged, which held the interest of the "students" better than offering the lectures free of charge. The course was well attended by the heads of local advertising departments, merchants and business men generally.

Advertising in all its forms was discussed. A digest of each lecture was prepared in advance and distributed among the students before the lecture began.

The course laid the foundation for the formation in Lexington of an up-to-date ad club, which was launched immediately after its conclusion and is now doing good work along advertising lines.

C. F. DUNN,
Secretary-Manager, Lexington Board of Commerce.

Real Estate Sale Promotes Xenia's Expansion

XENIA, OHIO.—Excellent progress is being made in the development of the 600-acre tract of land recently purchased from the Roberts Estate by Frank W. Dodds, President of the Xenia Chamber of Commerce. Paved sidewalks and curbs have been installed, and the Chamber is planning to conduct an intensive "Build Your Own Home" campaign in the city this

President Harding

Urges Road Maintenance. *He says—*



"I KNOW of nothing more shocking than the millions of public funds wasted in improved highways, wasted because there is no policy of maintenance. The neglect is not universal, but it is very near it. There is nothing the Congress can do more effectively to end this shocking waste than condition all Federal Aid on provisions for maintenance. Highways, no matter how generous the outlay for construction, cannot be maintained without patrol and constant repairs."

EXTRACT FROM FIRST MESSAGE
TO CONGRESS, WASHINGTON, D. C.
APRIL 12, 1921

Tarvia

*For Road Construction
Maintenance and Repair*



Road patrol maintenance crew patching improved road with "Tarvia-KP"

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Cincinnati
Nashville
Bangor
Lafayette
Denver
Halifax, N. S.

Pittsburgh
Syracuse
Washington
Bethlehem



ROBERTS TRACT LOOKING SOUTH

Showing how it runs into the heart of the city within one square of the Court House, City Building, Public Library, and other public buildings

spring in order to forward the work of house construction. By itself this statement does not mean a great deal, but behind it is an interesting story.

Xenia had been cut off from possible expansion northward for over fifty years by this Roberts tract, which had never been subdivided and whose owners, up to the time of the reorganization of the Chamber of Commerce a little over a year and a half ago, had successfully resisted all pressure brought to bear upon them. The tract runs to the very center of the city and includes the best building area in or near the city limits. The newly organized Chamber of Commerce has been the means of opening up this tract and removing the barrier.

After the property had been transferred to Mr. Dodds, the Civic Affairs Committee of the Chamber of Commerce coöperated with him in his desire that it be laid out in such a manner as to serve the best interests of the city by bringing to Xenia several city planners and specialists in city development work, who submitted plans. Several plans were drawn before one was found that satisfied everybody. The plan finally adopted is the result of the best efforts of those specialists.

Shortly after Mr. Dodds purchased the land, the Board of Education, which had been looking for a desirable location for a new high school building and an adjoining

athletic field, was induced by the Chamber to purchase enough ground on the undeveloped tract on which to erect the school. Mr. Dodds showed his appreciation of the Board of Education's efforts to increase its usefulness, by immediately donating to it six acres in the rear of the site purchased, for an athletic field and playground.

One of the interesting features of the plan adopted is that the tract is laid out so that a park containing 50 acres can be presented to the city of Xenia within two years in the event that the owner can arrange financially to make the gift.

In order to bring about a speedy disposal of the property, the Chamber engaged a firm of realty experts, of New Orleans, to come to Xenia and conduct an auction sale of the lots. That organization carried on its selling activities in a large tent located on the property, somewhat after the style of a Chautauqua assembly, and in a remarkable campaign disposed of 200 lots in three days of pouring rain.

Thus, through the efforts and vision of the Chamber of Commerce, Xenia is in a better position to expand than ever before, and will soon have a high-class residential section in the center of the city with boulevards 100 feet wide, wisely restricted.

LEWIS C. TINGLEY,

Formerly Secretary, Xenia Chamber of Commerce,
now Secretary, Chicago Heights, Ill., Cham-
ber of Commerce.



ROBERTS TRACT LOOKING NORTH

Taken from the same point as the one shown above, showing the expanse of the tract



“The Slide for Life”

Remember when you played Conquer Leader, the daring “Slide for Life”—down the side of a hay-stack, maybe? Remember the zest you developed for playing the game, the ambition to outstrip your playmates, the courage to see things through to a finish?

Perhaps the children in your city cannot have hay-stacks to slide down. But they can have playgrounds; playgrounds fitted with the most modern and scientific play tools yet produced, where they can make their “Slide for Life”—build courage, ambition, and the desire to win—just as you did years ago.

MEDART PLAYGROUND EQUIPMENT

For fifty years the Medart Company has manufactured and perfected gymnasium apparatus for vigorous men—an experience that has particularly fitted it for the leadership it has always maintained in the playground movement and in the development of playground equipment best suited to withstand the severe use and abuse of the children.

Catalogue “L” fully describes Medart Playground, Swimming Pool, Gymnasium and Locker Room Equipment. Contains valuable suggestions for playground installations. It will be sent gladly to anyone requesting it on their letterhead.

Fred Medart Mfg. Co., Potomac & DeKalb, St. Louis, Mo.

New York
52 Vanderbilt Ave.

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Rialto Bldg.

Boston's Comprehensive Americanization Program

By James A. McKibben

Secretary, Boston Chamber of Commerce

A PROGRAM of Americanization has recently been adopted by the Boston Chamber of Commerce which should go far toward solving the immigrant problem in this important American seaport. The fact that Boston is one of the cities where pro-Bolshevist agencies are firmly entrenched proves the need for intensive Americanization work here, and the thoroughness with which the program has been worked out shows that the Chamber's Committee on Americanization is in dead earnest in its intention to get results.

The fundamental idea of the plan is to organize the aliens in the various districts of the city and to have America made known to them by leaders of their own races who have themselves become loyal and successful American citizens. It differs from the plans of other organizations engaged in such activities in that the work is to be carried on with the assistance of these able representatives of the foreign-born; and in that the Chamber's plan contemplates district representation which will coördinate

and advance all existing methods of reaching the alien without supplanting the agencies that are now doing the work.

There are about 100 organizations engaged in various phases of this work. Many of them have been working at cross-purposes. There was much duplication and waste in their efforts, and many had no definite, clear-cut program. It is true that many of them are performing very useful service, but their work is often only a stop-gap and is not part of a comprehensive, community-wide program. No matter how sincerely these organizations undertake their tasks, they can accomplish only a fraction of the work that must be done.

The Chamber of Commerce is bringing these agencies together. Most of the larger ones, realizing that there is a most emphatic need to have the Americanization work in Boston coördinated, have declared that they will gladly work with the Chamber of Commerce on this basis. Therefore, instead of forming classes, hiring teachers and furnishing instruction for the foreign-born



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Montana.

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REG. U. S. PAT. OFF.

Calculating Machine

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J. C. KELLY,
State Board of Examination
Helena, Mont.

Monroe Calculating Machine Co., Woolworth Bldg., New York.

Without obligation (check items desired)

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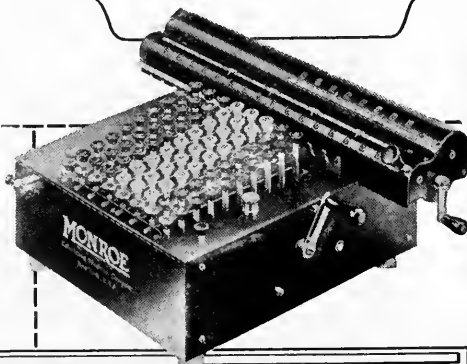
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Address.....

AC-5-21



groups, the Chamber's committee is utilizing the agencies already doing this kind of work, opening up new fields for their activity, supervising the establishment of classes wherever necessary, assisting them to obtain teachers and keep up the attendance at classes, and otherwise aiding them in the solution of their problems.

The Chamber is coöperating fully with the schools in getting this work done, and the schools supply teachers, direct classes, and standardize the various courses of instruction. The Superintendent of Schools is a member of the Chamber's committee which drew up the plan, and is thoroughly in accord with the Chamber's program.

What is the procedure? Stated briefly, the city is divided into districts, approximately fourteen, some of which have and others are to have a community center, usually in one of the schools or branch libraries. Each district has a committee composed of one representative of the Chamber's committee, who is the chairman; one or more English-speaking representatives of each of the races in the district, any considerable number of whose members cannot speak, read or write English; and a citizen, or citizens, resident in the district, who have the respect and goodwill of the residents generally.

It is the duty of each district committee to assemble information relative to the non-English-speaking and reading persons in the district, organize those individuals for educational work, and enlist the coöperation of the established agencies for teaching them English and citizenship in its various aspects.

To illustrate the manner in which the Chamber's program is working out, a brief summary is given below of the activities now under way or in contemplation in one district of the city:

At the committee's request a new reading-room of the Boston Public Library in the Italian colony has been authorized.

The number of readers at the branch public library has been practically doubled. Several hundred adult immigrants, who never visited the library before, are now regular readers.

Two thousand school children meet each week in groups to listen to graphic recitals of leading episodes in our history, presented by expert story-tellers in such a way as to make history interesting and increase the desire for reading.

Citizenship programs, including motion pictures, lantern slides, community singing and inspirational talks on the advantages and responsibilities of citizenship, have been presented before 60,000 persons. Another series of programs, about to be presented, will give each immigrant group an opportunity to show what it is contributing to America.

Four thousand children of immigrants are conducting an enrollment among their parents and relatives for public evening school classes in English and citizenship.

Factory classes in English and citizenship are being arranged through the coöperation of plant executives.

Improvements have been obtained in the facilities of the playgrounds of the district.

Sixteen civic, educational, racial and welfare agencies are coöperating with the committee on various projects.

Advice on business, legal and citizenship matters has been given to a large number of individuals and racial organizations.

Apart from the district programs, the



THE \$100,000 WILL FILL THESE EMPTY SHELVES

committee has undertaken several activities of city-wide interest. For instance, it coöperated with the trustees of the Boston Public Library in an effort to obtain from the city a greatly increased appropriation for purchasing new books for use in the districts where the immigrant groups have settled, and succeeded in obtaining an appropriation of \$100,000 for that purpose.

It is holding a series of "fellowship" meetings, to bring together the business men of each immigrant group with the members of the Chamber, and to awaken



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Are made of pure ingot iron which by actual laboratory tests has been shown to be the most rust-resisting for this purpose. Newport culverts are made in round and half-round forms to cover all conditions for which culverts may be used.

The proper drainage of the territory on the high side of a road makes it necessary that water be readily removed by a culvert that is permanent, not one which rusts or may be cracked by the first heavy load passing over the road. Newport Culverts resist the load, do not rust and serve faithfully year after year with no maintenance costs.

Send for our literature describing the special features of Newport Culverts.

NEWPORT CULVERT CO.
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a desire for closer team-work among them for promoting the interests of the city. At the first of these meetings, more than 300 Italian business men and Chamber members came together, with gratifying results. Preparations are now being made to hold a similar meeting for the Greek business men and the Chamber members. Incidentally, the contacts established in this and other activities have been responsible for adding a large number of business men of the immigrant groups to the membership of the Chamber, and have helped, thereby, to make the Boston Chamber what we believe to be the largest commercial organization in the world.

Another feature of the work is acquainting the community with the alien's point of view. There is a growing tendency, be-

cause of various erroneous ideas on the subject, to view all foreigners with some suspicion. This must be checked, or great harm will follow. It is proposed to form a sub-committee on Alien Contribution to American Life. This committee will organize speakers from the different racial groups, and opportunities will be sought for these speakers to appear before the various groups in the community and tell the story of their people, their aims, aspirations, and their attitude toward the United States. This is a new piece of work in Americanization, and it is being undertaken for the sake of the desirable foreign-born already here and those coming, as well as for the sake of the community, which must come to know better the alien groups making up so large a part of the community.

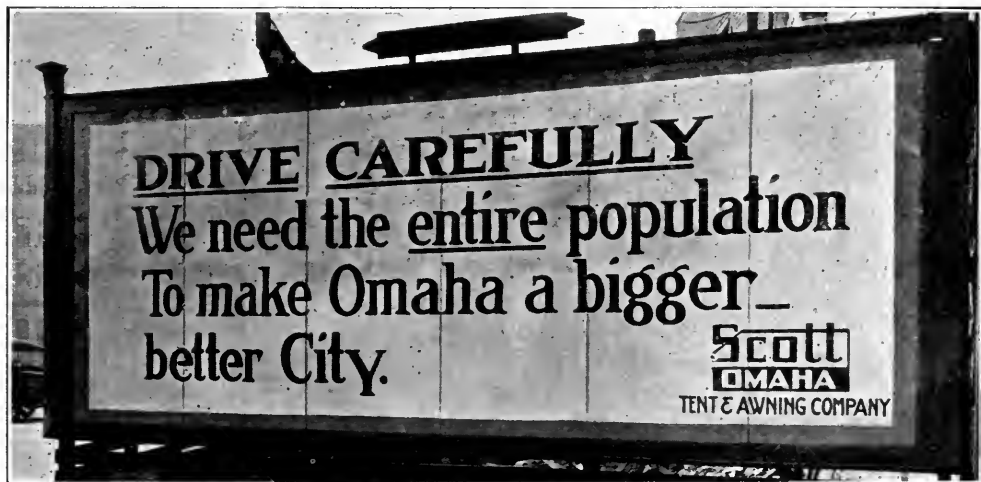
Auto Accidents Reduced by New Form of Commercial Advertising

The city of Omaha, Nebr., like every other community, has been seriously affected by reckless driving habits. To help remedy this condition, A. C. Scott, a local manufacturer, conceived the idea of using his bill-board space to benefit the public by calling attention to the need for greater care on the part of automobile drivers.

The words "Drive Carefully" were adopted as a slogan and used, with an appropriate comment or warning, on fifteen bill-boards erected throughout the city at points where the vehicular traffic is heavy.

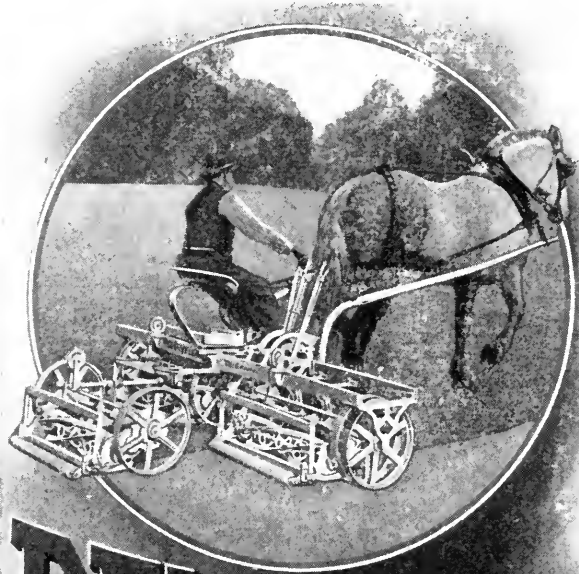
The warning was phrased differently in each case; all were absolutely inoffensive, but were so worded as to impress upon the mind of each driver the necessity for being careful, and to make him feel that the message applied as well to every other driver who passed the bill-board.

That the "Drive Carefully" slogan and the catchy lines used with it have resulted in reducing the number of accidents in Omaha is attested by the members of the Police Traffic Department who keep the accident records.



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THE "PENNSYLVANIA TRIO" is the culmination of the famous Pennsylvania *Quality Line*. It embodies all the exclusive quality features. No other mower will cut grass on golf courses, big estates or parks as efficiently, economically or speedily.

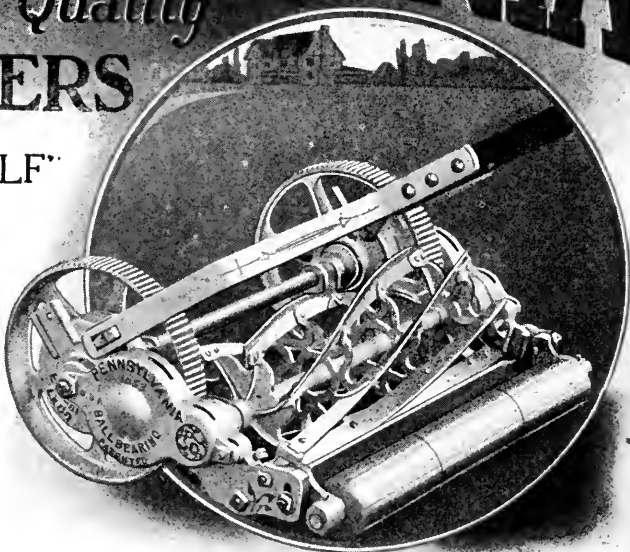
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Municipal Finance

BONDING

ACCOUNTING

TAXATION

The City Manager and the Municipal Budget

By C. E. Rightor

Detroit Bureau of Governmental Research

MOST of the city-manager cities thus far are among the smaller ones, usually less than 100,000 population. In these cities the commissioners are busy men, devoted to the cause of public service in which they are engaged, but having private business interests which require some of their time and energy. The manager, on the other hand, has but one interest—he is employed to devote his whole thought and attention to serving the entire citizenship, to getting done the things expected of the government by its citizens, and in a manner and at the time desired by them. This singleness of purpose places a great responsibility upon a city manager. His work is the profession of public service. He must be a student of human nature, be able to read and interpret the public mind, influence and direct public opinion, know community needs, anticipate collective desires, and fulfill citizens' wants.

Because of existing conditions, the manager's relation to the budget becomes an all-important one—first, last, and *ad interim*. Usually the charter decrees that he shall "prepare the budget." He thus becomes, in effect, not only an executive but a legislative official—a director of public opinion as to the course of the government for a given period. In most cities the commission "passes the buck" to him; it awaits his recommendations, accepts them after a general review, and returns them to him in the form of an appropriation ordinance to carry into effect.

Recognizing the importance of the city manager's position to the budget, what shall be his attitude and treatment of it? But before going on, let us define the term. As

a Detroit newspaper stated editorially, "The word 'budget' intrigues the imagination * * * There are good, bad, and indifferent budgets." The definition given by the U. S. Bureau of the Census is as follows:

"A municipal budget is a formal statement of the financial program or plan of a municipality for a fiscal period, comprising a statement of authorized municipal expenditures for that period correlated with the estimated revenues and other resources for meeting them."

At the November, 1915, meeting of the City Managers' Association, Gaylord C. Cummin, then City Manager at Jackson, Mich., delivered a carefully prepared paper on this subject. As to the details of procedure, I can add little to his discussion. So far as I can observe there is little new on the subject since the January, 1915, bulletin of the New York Bureau of Municipal Research, entitled "Next Steps in the Development of a Budget Procedure." If one is able to get from that bulletin the practical application of the principles and procedure there enunciated, he is well on the way toward a satisfactory budget.

Fundamentally, the budget should be prepared in accordance with a standard procedure, and the accepted practice, as I understand it, is that the budget consists of two primary sections—the requests for expenditure, and the estimates of income to meet those costs. The information relative to requests should be arrayed in order:

1. By funds
2. By departments
3. By activity
4. By character
5. By objects

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*Have you
a crime
wave in
your town?*



Typical Holophane Unit in Milwaukee, where authorities report crime has been greatly decreased by the Holophane installation.

Dept. E-22

LIGHT waves are the best means for dispelling crime waves.

More light means less crime.

We offer you more light without increased cost.

By utilizing efficiently the light now generated, by turning down to earth the light that is now wasted in the skies, by spreading the light out evenly over the areas between lamps, Holophane Street Lighting Refractors light the dark places and make streets safe for citizens instead of burglars.

Be sure the equipment you buy has the name Holophane stamped on the glass, showing it is made by the Holophane Glass Co. Genuine Holophane Street Lighting Refractors are of two-piece, dust-proof construction, and control the light by means of scientifically designed prisms. Beware of single-piece imitations that embody mere corrugations, not scientifically calculated prisms.

A lighting engineer will gladly confer with you about improving your street lighting if you will write to the General Electric Co., Schenectady, N. Y., or branches; the Westinghouse Electric & Mfg. Co. (Geo. Cutter Works), South Bend, Ind., or branches; the Line Material Co., South Milwaukee, Wis., or

HOLOPHANE GLASS CO.

340 Madison Avenue, N. Y. C.

Works, Newark, Ohio

In other words, if a city has numerous funds—as General, Road, Water, Sewer, Park, Interest and Sinking, etc., each should be considered in its entirety in the budget; the departments affected by each fund should be listed in order under it. Again, under each department or organization unit the specific activities performed by that unit should be considered in order.

In the task of analyzing departments by activities I believe we still have much to do, although really the *activity* should be the basis for our requests. For instance, in Detroit we recognize police as a department, but in requesting appropriations the following activities are cited:

1. Administration
2. Accounting, pay-roll records and supplies
3. Record bureau
4. Property bureau
5. Criminal identification bureau
6. Licenses and records
7. Medical service
8. Inspection of weights and measures
9. Dog pound
10. Garage and repair shop
11. Care of police signals and records
12. Care of buildings and grounds
13. Uniformed street patrol duty
14. Mounted patrol duty
15. Traffic duty
16. Auto ambulance and arrest duty
17. Precinct station duty
18. Harbor patrol duty
19. Sanitary patrol duty
20. Detective duty, etc., etc.

While obviously this refinement is unnecessary in the smaller city, its value when weighing increases from year to year is apparent in a fund spending four and a half millions.

Under each activity, standard procedure calls for classification as to whether capital outlay or current operation; and, finally, for maintenance and operation costs, a statement of objects to be purchased, in accordance with a uniform classification of accounts applicable to all departments. On the income side, the sources of income available to finance the government should be uniformly classified.

I submit that this general procedure is practically adaptable by any sized city, and may be refined to any extent that circumstances dictate.

In addition to this classification, it is necessary to give some attention to the arrangement of the columnar information required of the departments. Needless to

remark, the entire document should be reviewed carefully by the manager in a series of conferences with the department heads, in order that the whole program may be coördinated.

This, I believe, is the common practice, and so far so good. But it is not enough. For years we have proceeded along these lines, but something seems lacking. The citizens do not show enough interest.

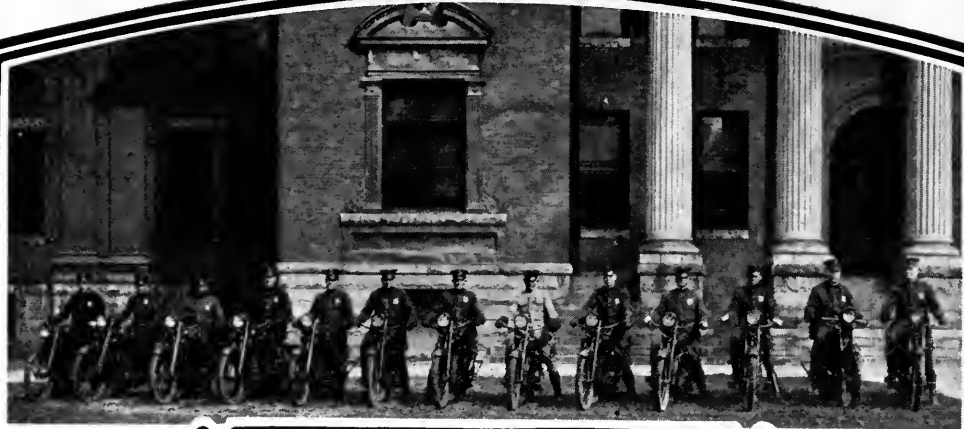
The Budget Is the People's Concern

Being the financial statement of the prospective program of the entire city's service, the budget naturally should be of interest to every citizen, but up to the present in the vast majority of our cities this universal citizen interest has not been manifest. I attribute this lack of popular concern to the fact that the budget is not an intelligible document. It seems to me that thus far we have emphasized *figures* rather than *facts*.

How may the budget be made a popular and effective instrument, understood by the ordinary citizen? Prof. Hatton has written that the budget "may be made one of the most potent instruments of democracy." Dr. Cleveland has said: "The budget must be considered as the most important measure of any government." What do these and similar expressions mean? They mean that if the people who are exercising self-government are acquainted with the facts, they will choose for themselves those services which they wish the community to perform for them, and how these activities shall be financed.

In addition, therefore, to the array of budget information in the usual cold statistical form, it is essential that the figures be given some life. There is no reason for limiting a budget to this array of figures. A budget is not merely an appropriation ordinance in the rough; it is all the information that may be collected together as an exposition of what is planned by those in authority to undertake for the ensuing fiscal period. Therefore, the figures should be interpreted with a running broadside of comment.

Probably chief of these comments should be the comparison of the forthcoming year's requests with the appropriations for the current year, expressed in dollars, and a thoroughgoing explanation for all increases and decreases. "Where there is nothing to compare, there is nothing to



Detachment of City Police mounted on Harley-Davidson Motorcycles, Columbus, Ga.

Another City Cuts the Cost of Police Efficiency

Columbus, Ga.
January 22nd, 1921.

This department has been using motorcycles since 1909, and after using several makes of machines, we decided in 1912 to try the Harley-Davidson, and found it to be the best machine of the lot used.

We think so much of it that we have placed an order for 10 more to be delivered about February 1st this year.

I would recommend the Harley-Davidson to any department, for speed, durability and low cost of upkeep.

J. T. MOORE,
Chief of Police,
Columbus, Ga.

"I would recommend the Harley-Davidson to any department for speed, durability and low cost of upkeep."

That's what the Chief of Police of Columbus, Ga., thinks about the Harley-Davidson for police work. And hundreds of other city officials know how this swift, rugged mount increases police efficiency at small cost.

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See your local Harley-Davidson dealer for demonstration. Or write to us for special literature on police use of motorcycles.

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criticise." Increases should show definitely whether the added cost of government is due to furnishing taxpayers with new and additional services, or is merely the increased cost of continuing already existing activities. We should differentiate between the expansion of governmental activities and the shrinking value of the dollar, and conclusively prove our case in either event. And we should bear in mind all the while to talk in terms of specific activities, or services which the citizens are to receive.

There is much of value in comparing the requests for the new year with the annual report for the past year—in other words, comparing the requests with statements of actual accomplishments. A year ago there was before us at budget time twelve months of anticipation. To-day there are twelve months of realization upon that anticipated program. How far has the city attained the goal which it sought to attain? The usual public officer, in preparing his budget, is willing to make elaborate requests for the new year, but to have the people forget so far as possible all questioning relative to past requests and what they received for the taxes they paid.

I shall attempt no further discussion of the mechanics of budget preparation. I believe the greater interest lies in the *use* of the budget material. Granting that all the data are arrayed, what shall we do with them? It is necessary that the public officer get his message to the public. At least two channels afford this opportunity—the newspaper and the public hearing.

How to Reach the Public

As the budget is the most important matter coming before the legislative body of the city during the year for its consideration, certainly because of its universal bearing upon the home owner, the manufacturer and the housewife, they should know of its effect upon their welfare, protection and prosperity. Without a doubt, the best agency to tell all classes of citizens and taxpayers about the budget is the newspaper, and equally certain is it that no better front-page story can be obtained by the paper than that of the plans of its own city government for the year. I need not dwell upon the value of the newspaper as a medium of information and influence in wielding public opinion, in which position it stands without a parallel in American

municipal life to-day. The majority of citizens read the daily papers; they have not the leisure or patience to get the facts first hand for forming independent judgments on public questions. They hastily scan the newspapers and magazines and ordinarily accept their conclusions. The budget should be prepared with the idea of presenting it to the newspapers.

I would emphasize the urgency, the duty, the opportunity of the city manager in "selling" his budget story to the local papers. It is not always that the reporter realizes the duty of his paper to its readers. The manager should urge upon the editors the importance of widespread publicity about the city's plans for the new year, and see that they handle public questions without partisan or personal bias by giving them the material for their articles. To do this requires the exercise of no small sense of modern commercial advertising and selling ability.

Another opportunity for getting the "facts to the folks" is the public hearing. My observation has been that the public doesn't trouble itself to be heard. And yet I believe the hearing will not need to be combined with moving pictures, and possibly a musicale or vaudeville on the side, if the document is humanized.

We have not taken full advantage of the organized agencies in our communities in this matter. My experience leads me to conclude that fortunate is the city having a disinterested civic organization which has the time and ability to tear the budget apart and find out what it is contemplated to spend the people's money for.

There are already over forty such agencies in our larger cities, and new ones are being established. They are variously known, as bureaus of governmental or municipal research, institutes for public service, taxpayers associations, etc. In all cases their programs and purposes are similar.

Such bureaus are not the only mediums. There are the chambers of commerce, which, fortunately for the cause of better government, are emphasizing more and more the civic phases of their work. There are the neighborhood improvement associations, civic associations or clubs, real estate exchanges, inter-business clubs, and latterly the women's clubs. All these, and more, may be induced to spend some time in consideration of the budget and go to

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Used by progressive municipalities
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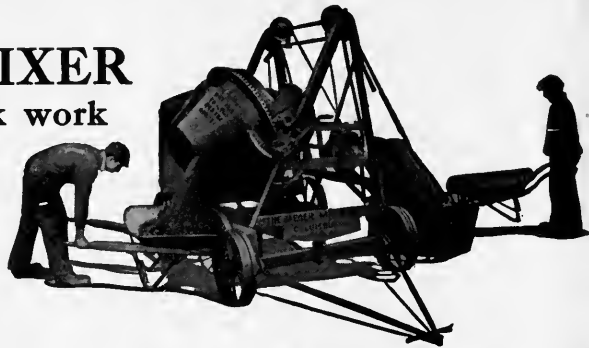
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The Jaeger Machine Co.

215 West Rich Street

COLUMBUS : : OHIO



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PATENTED

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IS THE ONLY ONE THAT IS SAFE
TO INSTAL OUTDOORS BECAUSE

it is the only drinking fountain
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**THE ONLY FOUNTAIN MADE
THAT IS STRONG ENOUGH
TO WITHSTAND PUBLIC
ABUSE.**

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make the "public hearing" by the city fathers mean something. And with their interest the excellence of the government will be assured, and the modern, honest form of government will have no fear for its permanency.

Every fourth or fifth year it would be well to put on a municipal exhibit, telling graphically the wide range of activities undertaken by the present-day municipality.

Summing up, then, it is my contention (1) that the fundamentals of mechanical procedure should be followed in preparing the budget for any city; (2) that the activity should be the unit for thinking and talking about that government, and should be the unit of appropriation, leaving the manager free to expend or transfer funds as required to perform that service; (3) that

the figures should be supplemented by running comment, specifically explaining increases; and (4) that this information should be gotten to the citizens, through the newspapers and public hearings, in order to achieve popular support and assure the permanency of a democratic form of government.

These are my personal impressions of how any city may realize upon that cogent comment upon the budget made by Gladstone when he said:

"Budgets are not merely affairs of arithmetic, but in a thousand ways go to the root of prosperity of individuals, the relation of classes and the strength of kingdoms."

EDITORIAL NOTE.—This article is from an address prepared for the seventh annual convention of the City Managers' Association, at Cincinnati.

Competition for Plan for Sewerage System, Chauny, France

The American Committee, La Renaissance des Cités, has announced an interallied competition for a plan for a sewerage system in Chauny, France, in which American sanitary engineers are especially invited to join. La Renaissance des Cités, whose president is M. Charles Dumont, Reporter-General of the Budget, and whose membership includes some of the leading engineers, architects, and other technical men in France, is the chief agency aiding the destroyed communities of the war zone in scientific planning and permanent rebuilding. It has helped with the plans of more than 200 towns, including Rheims, and is being assisted by the American Committee in rebuilding Pinon as a demonstration of the possibilities of city planning for the benefit of the entire war area.

From the competition for Chauny's sewerage system, La Renaissance des Cités hopes to develop ideas which will be useful in many other manufacturing towns of medium size.

The first prize in the contest is 10,000 francs, and the second 5,000. The time limit for submitting plans is June 10, 1921. The sketches and other documents needed by contestants may be obtained from the French headquarters of La Renaissance des Cités, 23 rue Louis-le-Grand, Paris, France, for 65 francs (\$4.55 at present rates of exchange), of which 50 francs will be returned when the documents are sent back. Further details may be obtained from the American Committee, whose headquarters are at 248 Boylston Street, Boston, Mass.

Among the prominent engineers connected with the Committee are Frederick H. Fay, Edwin Farnham Greene, Charles T. Main, and Edwin S. Webster of Boston, Professor George F. Swain and Professor George C. Whipple of Harvard University, Charles Saville of Dallas, Tex., George W. Fuller and E. P. Goodrich of New York City, and Harland Bartholomew of St. Louis.

On the Calendar of Conventions

MAY 9-11.—PITTSBURGH, PA.

National Conference on City Planning. Secretary, Flavel Shurtleff, 60 State Street, Boston, Mass.

MAY 11-13.—WASHINGTON, D. C.

American Institute of Architects. Secretary, William S. Parker, The Octagon, Washington, D. C.

MAY 31-JUNE 3.—PASADENA, CALIF.

National Electric Light Association. Acting Secretary, S. A. Sewall, 29 West 39th Street, New York, N. Y.

JUNE 6-10.—CLEVELAND, OHIO.

American Water Works Association. Secretary, J. M. Diven, 153 West 71st Street, New York, N. Y.

JUNE 15-16.—ASHEVILLE, N. C.

Tri-State Water and Light Association. Secretary, W. F. Stieglitz, Columbia, S. C.

JUNE 22-29.—MILWAUKEE, WIS.

National Conference of Social Work. Secretary, W. H. Parker, 25 East Ninth Street, Cincinnati, Ohio.

JUNE 14-16.—SAN FRANCISCO, CALIF.

National Fire Protection Association. Secretary, Franklin H. Wentworth, 87 Milk Street, Boston, Mass.

JULY 19-23.—OAKLAND, CALIF.

American Physical Education Association. Secretary, Dr. J. H. McCurdy, 93 Westford Avenue, Springfield, Mass.

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A Municipally Owned Astronomical Observatory

By Frank E. Wetherell
City Planner

A MUNICIPALLY owned astronomical observatory is a unique institution. Des Moines is now building one at public expense, and the writer knows of no other city in the world that has provided the public with a building of this character.

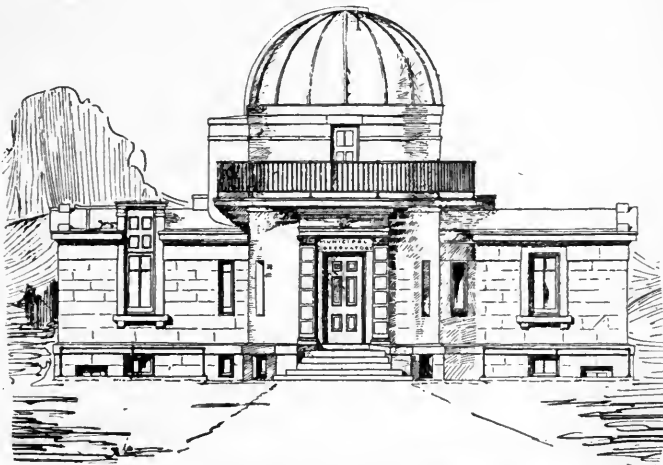
The idea was conceived a few years ago by Professor D. W. Morehouse, who, in his work in the Drake University Observatory, had been experiencing difficulties with the vibration of the telescope, caused by the near-by street traffic. He prevailed upon the trustees of the University to offer to the city the use of the fine 9-inch telescope, together with his services, for general public instruction in astronomy, provided the city would erect an adequate building in Waveland Park, where he had selected a suitable location.

The City Council promptly took advantage of the offer, set aside the chosen spot for the building and proceeded to provide ways and means for financing the project. As soon as the plans were drawn, the contract was let for approximately \$55,000. The building is now over half completed. It is fire-proof, has a stone exterior, and in design is severely plain, with archaic Greek details.

On the first floor will be a small office for the Professor, a transit room, and a lecture hall seating 150 people. Here will be given lectures to those interested in astronomy. It is also proposed to use the hall for other gatherings of an educational nature.

In the basement will be located an oil-burning heating plant, and comfort stations for men and women. As Waveland Park is one of the most popular municipal golf courses, these comfort stations will be a great convenience.

The telescope will be located in the usual domed room on the second floor over the rotunda; surrounding this room on the outside will be the observation balcony, and over the assembly room is to be a large flat



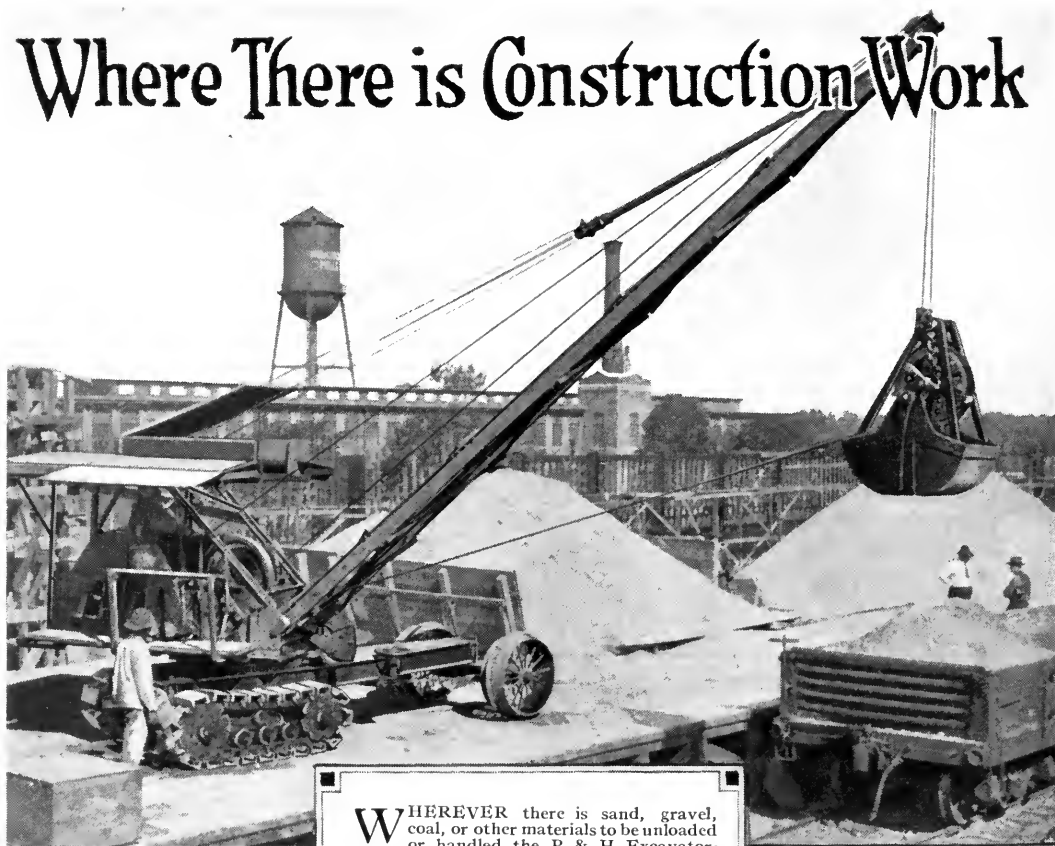
A MUNICIPAL OBSERVATORY IS SOMETHING NEW IN
AMERICAN CITIES

promenade roof where the instructor can take groups of people for star-gazing and the study of the constellations. Arrangements will be made to accommodate classes of high school students so that they will have special advantages in the science.

So astronomy is soon to become a regular educational feature in Des Moines, with one of the best-equipped observatories in the country, where every facility will be provided to make the science popular.

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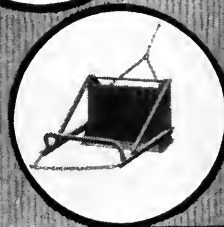
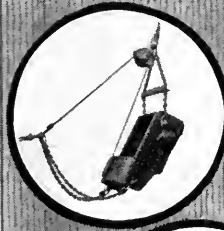
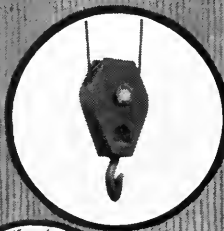
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The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing
Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

Giving Note of Councilman as Hostage for Promise to Vote in a Certain Way

A novel transaction in municipal affairs is aired by the opinion of the Court of Common Pleas for Lackawanna County, Pennsylvania, in the case of *Metrinko vs. Chomin*, 11 Pennsylvania Municipal Law Reporter, 249. The court finds that defendant agreed with co-councilmen of a borough to vote for a certain set of candidates on organization of a newly elected council. As a guaranty that defendant would comply with his agreement in this regard he executed a note containing power of the payee to enter judgment for the amount of the note, \$1,000. It is further found that defendant "apparently did not keep his promise," and plaintiff thereupon entered judgment on the note. But, on defendant's petition and proof of the facts above mentioned, the Court vacated the judgment, on the ground that the agreement was void as tending to contravene the public interest by limiting a municipal officer's freedom of action. We quote the following excerpts from the opinion:

"We know of no law which Chomin violated when he promised to vote for a certain set of candidates at said ensuing organization. For a member of council to agree to vote for certain candidates does not violate any law of the commonwealth of Pennsylvania, and does not involve any moral turpitude on the part of the promissor.

"Next Chomin was asked, as a guaranty of his carrying out his promise, to deliver to the plaintiff a hostage in the form of a judgment note for \$1,000. This the defendant, Chomin, was imprudent enough to do. We know of no law which Chomin violated in executing and delivering this judgment note as a pledge of his good faith. The proceeding has an ill-savor, but the act of Chomin in executing and delivering this note is not on a par, for example, with the act of a man who would execute and deliver a judgment note for the purpose of employing somebody to commit a crime. In this case Chomin merely gave a judgment note as a guaranty that he would carry out his promise. It may have been unstatesmanlike for a mem-

ber of the legislative body of Olyphant borough thus to restrict his future freedom of action in the selection of borough officers, but to be deficient in statesmanship is neither immoral nor illegal.

"The most immoral and unconscionable feature of this entire transaction is the attempt on the part of Simon Metrinko to collect upon a judgment note under the circumstances related. He sets up no claim that there was any consideration for this note. He sets up no claim that Chomin is indebted to him in any sum whatsoever. In spite of the fact that Chomin owes him nothing, Metrinko comes forward and demands his pound of flesh because 'it is so nominated in the bond.' We believe it would be most inequitable and unconscionable on the part of a court possessing equitable powers to permit, by its failure to exercise those powers, the consummation of a fraud of this character."

Right of Municipal Corporations to Remove Officials, Thereby Precluding Salary Claims

A municipality may remove its officials for misconduct although not expressly so empowered by charter; the power is implied as being incidental to proper conduct of the affairs of the corporation. But where the officer to be removed holds office for an unexpired term, he cannot be removed without notice of charges preferred against him and opportunity to be heard on them. And there is a right to review the order of removal in the courts. A city marshal's refusal to levy certain executions of the city not shown to be invalid justified his removal by the mayor and council. (*Georgia Court of Appeals, Burney vs. Mayor and Council of City of Boston*, 100 Southeastern Reporter, 28.)

Majority of Council a Quorum

"The general rule is that a majority of a council or board is a quorum and a majority of the quorum can act." This rule prevails in the absence of statutory or charter provision to the contrary. (*Massachusetts Supreme Judicial Court, Merrill vs. City of Lowell*, 128 Northeastern Reporter, 862.)



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Belt Pulley: Dia. 8 in., face 6 in.

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Appropriations by City for Purposes Not Within Ordinary Objects of Municipal Government Are Held Void

That under the ordinary municipal charter cities are powerless to render direct assistance to tenants of houses, apartments, etc., in resisting rent advances, is, in effect, the conclusion of the New Jersey Supreme Court. And, howsoever much we may sympathize with the tenant when he is oppressed, the soundness of the Court's decision is manifest, especially when it is remembered that municipal councils, as well as state legislatures, may exercise only such legislative powers as are expressly or impliedly vested in them by charter or constitution.

The New Jersey Court annuls ordinances of Jersey City which attempted to devote municipal funds to the defense of suits and proceedings against tenants in instances in which rent profiteering is asserted, and which purported to require landlords to file with the city notices to tenants of rent advances or to vacate.

The courts have often declared to be void appropriations for purposes not falling well within the ordinary objects of municipal government, even where there has been no express charter or constitutional prohibition—as sometimes appears—against appropriating money for the benefit of corporations, institutions and individuals. The general state of the law on this subject has been authoritatively summarized as follows:

"Municipal funds may be appropriated to any public purpose, within the scope of charter powers; but ultra vires [unauthorized] appropriations are invalid.

"Unless expressly authorized so to do, a municipality has no power to appropriate municipal funds for celebration, even of patriotic holidays, nor to the entertainment of persons or societies as municipal guests.

"As a general rule, municipalities cannot make appropriations for gratuities, charities, or private uses, nor for a debt barred by statute. Such diversion of public funds is the perversion of a public trust." 28 Cyc. 1534-1536.

A decision squarely in line with the holding of the New Jersey Supreme Court appears in the Canadian case of *Jarvis vs. Fleming*, 27 Ontario Reports, 309, in which it was decided that a city was properly enjoined from making an appropriation in

favor of a private individual to reimburse him against the expense of maintaining litigation against a gas company on behalf of himself and other consumers to recover money claimed to have been improperly obtained by the company from the consumers.

Other decisions in point are as follows:

By the Iowa Supreme Court, holding that the fact that a municipal appropriation will incidentally serve a public purpose will not make it valid, if in reality it is made to promote private ends. (*Brooks vs. Brooklyn*, 146 Iowa Reports, 136; 124 Northwestern Reporter, 868; 26 Lawyers' Reports Annotated, N. S., 425.)

By the Ohio Supreme Court, holding that the city of Cleveland could not make a valid appropriation for the benefit of a public library board constituting a department of a separate political subdivision, although such other subdivision was substantially coincident in territory and population with the city. (114 Northeastern Reporter, 247.)

By the Pennsylvania District Court, holding that a municipality was powerless to vote money for the relief of citizens of foreign states. (*Commonwealth vs. Brown*, 15 Pennsylvania District Court Reports, 582.)

By the Pennsylvania Supreme Court, holding that giving a pageant illustrating the history of a city was not a proper municipal enterprise. (*Pageant Association vs. Philadelphia*, 260 Pennsylvania Reports, 447.)

By the Minnesota Supreme Court, holding that a city could not appropriate funds to reimburse a defeated candidate for a public office for expense incurred in conducting an election contest. (*Castner vs. Minneapolis*, 92 Minnesota Reports, 99 Northwestern Reporter, 361.)

By the New York Supreme Court, Appellate Division, holding that a city could not award damages on account of a change in a street grade completed before the beneficiary of the award acquired the abutting property constituting the basis of the allowance (*People vs. Phillips*, 88 New York Appellate Division Reports, 560; 85 New York Supplement, 200); and holding that teachers already retired could not be pensioned (*Mahon vs. New York Board of Education*, 68 New York Appellate Division Reports, 154, 74 New York Supplement, 172).

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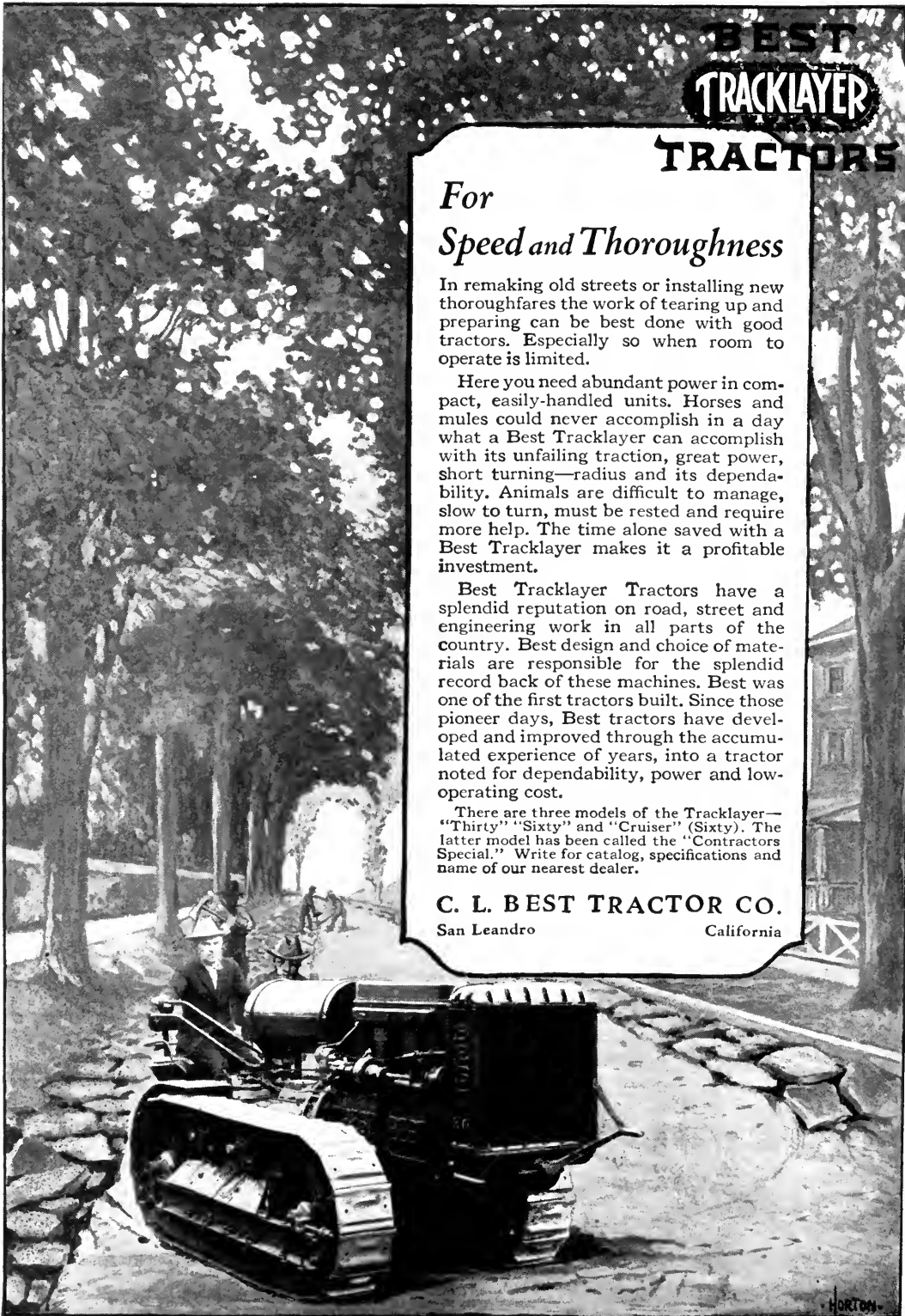
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Cities May Require Notice of Removals of Furniture, Etc., to Be Given by Transfer Men

An ordinance of the city of St. Louis makes it the duty of persons engaged in the business of moving goods to notify the city register within ten days after removing any household goods, etc., from one place to another in the city, where the owner intends to change his place of residence or place of business. The notice must show the places to and from which the goods are being removed, giving a brief, general description of the goods.

The validity of this regulation was attacked, but sustained, in the case of *Wagner vs. City of St. Louis*, 224 Southwestern Reporter, 413. In disposing of the case the Missouri Supreme Court does not specify just what justifies a requirement of this kind, but intimates that, as in the matter of regulations of junk dealers, the ordinance has a legitimate tendency to avoid offenses against ownership of personal property, as where a buyer of furniture on the installment plan attempts to dispose of the goods without paying for them.

It is held that the charter of the city gave ample authority for adoption of the ordinance, in a clause authorizing the city "to license and regulate all persons, firms, corporations, companies and associations engaged in any business, occupation, calling, profession or trade."

Until His Successor Is Qualified, a Public Official May, on Grounds of Public Welfare, Be Required to Perform His Duties

One of the most interesting decisions recently handed down by a court within the bounds of municipal corporation law is to be found in the case of *State vs. Blair*, 105 Southeastern Reporter, 830, decided by the West Virginia Supreme Court of Appeals. The Court issued a writ of mandamus to defendants, as mayor and councilmen of town of Harrisville, commanding a canvass of an election at which it is claimed defendants' successors in office were chosen.

The gist of the decision is that the resignation of municipal officers, although accepted, will not be held to release them, until their successors have qualified, from the performance of duties essential to the con-

duct of the municipal affairs.

The defense interposed in the suit was that the resignation of four councilmen left no quorum to either fill the vacancies or canvass the election of their successors.

"As the attempted resignation of the respondent councilmen is abortive, and does not relieve them of their duty to meet, canvass, declare and certify the result of the election," says the Court "we deem it unnecessary to decide whether these councilmen could all in a body, at one time, resign, and vote acceptance of their own resignations."

The opinion cites several authorities where it had been previously decided that responsibility for the performance of official duties could not be avoided by resignation, until qualification of a successor. One of the precedents was a case where a town supervisor in Illinois attempted to thwart execution of town bonds.

City Ordinance to Prevent Establishment of Lumber Yards Without Permit, Upheld

The Minnesota Supreme Court upholds the validity of an ordinance of the city of Minneapolis, providing that "no person shall hereafter install or open any lumber yard or erect any building, for the sale or storage of lumber within the city of Minneapolis without the consent of the city council." Speaking of this ordinance, which contains provisions for issuance of permits on application, and holding that the regulation is within the city's charter powers, the Supreme Court says:

"It cannot seriously be doubted that the matter of the location, and to an extent the condition and care of lumber yards, where large quantities of lumber and building material are accumulated in piles and tiers of piles, are matters proper for proper police regulation and control. The location of such yards may, even though properly cared for by the owner, become a fire menace and a source of danger to and destruction of surrounding property, a rendezvous for thieves and other violators of the law, and their location at least should be within control of the proper municipal authorities of every city and village having a population and built-up district sufficiently large to render them or their use a menace to public order and safety."

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Municipal and Civic Publications

LOCATION, GRADING AND DRAINAGE OF HIGHWAYS

Wilson G. Harger, C.E., Engineer, New York State Department of Highways. McGraw-Hill Book Company, Inc., New York. 1921. xiii + 294 pp. Tables, diagrams and illustrations.

This book is the first of a series of four volumes designed to present the road problem from the standpoint of the constructing engineer. This first volume discusses the general principles governing the policy of highway programs, such as scope, general character, classification, layout, appropriation estimated, the fundamental principles of design, and reasonable economy in design. The illustrations are clear and to the point, and tables and diagrams are numerous and helpful to the reader in very clearly bringing out the discussion of all points throughout the book. One of the features of this volume which is new and will be appreciated by all readers, is that the page references in the index are given in their order of importance, so that the first reference will usually cover the most used data. This novel method saves much of the time ordinarily lost in searching an index for the reference which carries the most important data.

THE HOUSING BOOK

Compiled by William Phillips Comstock, Editor of "Architecture and Building." 132 pp. Illustrated. The William T. Comstock Company, New York.

This work, which has been compiled from the designs of many prominent architects, contains photographic reproductions, with floor plans, of different types of workmen's homes. There are one- and two-family houses of frame, brick, stucco and concrete construction, also four-, six-, and nine-family apartments. It shows also single houses, groups, and developments that have been recently built in various parts of the United States.

PRINCIPLES OF GOVERNMENT ACCOUNTING AND REPORTING

Francis Oakey, C.P.A., Member of the American Institute of Accountants, and Chief Consulting Accountant, Institute for Government Research. 1921. 561 pp. D. Appleton and Company, New York.

A careful study of the manner in which government accounts should be kept, and the proper form and content of public reports of government financial transactions. Municipal government accounting and reporting is covered in particular, and there are chapters dealing with such subjects as funds, balance sheets, funded debts and sinking funds, and statements of assets and liabilities. One chapter is devoted to the subject of the budget as a report.

CHILD WELFARE

"The Child Welfare Handbook." Second edition, enlarged. Published by the National Child Welfare Association. 47 pp. Illustrated. Attractive presentation of material on child welfare, with numerous reproductions of posters and panels which may be secured for local use. (Apply to publishers, 70 Fifth Avenue, New York, N. Y.)

SUGGESTIONS FOR RECREATION

"What Can We Do?" Descriptions of many kinds of social games, prepared by Community Service. 32 pp. (Apply to Community Service, 1 Madison Avenue, New York, N. Y.)

WAR MEMORIALS

"War Memorials." This pamphlet, contributed by the Boston Society of Architects and the Boston Society of Landscape Architects for the use of towns and cities in New England, gives illustrations of many kinds of war memorials, both simple and elaborate. (Apply to Harry J. Carlson, Chairman, War Memorial Committee, Boston Society of Architects, 89 State Street, Boston, Mass.)

NEW YORK'S FIRST MUSIC WEEK

C. M. Tremaine, Director, National Bureau for the Advancement of Music, and Secretary, Music Week Committee. Illustrated. Published by the National Bureau for the Advancement of Music, New York. 1921. 184 pp.

This is a detailed history of New York's first Music Week, held in February, 1920. It will be found an inspiration and a guide for similar undertakings planned throughout the country.

WHAT AMERICA MEANS TO ME

Henry E. Jackson, Published by the National Community Board, Washington, D. C. 1920. 236 pp. Illustrated.

The book has been written to promote the Citizenship Club movement. It defines America, and gives inspiring suggestions to those engaged in Americanization work. A number of excellent selections are included, from Thomas Jefferson, Henry Ward Beecher, Edward A. Steiner, Woodrow Wilson, and others.

THE SCIENCE OF HIGHWAY TRAFFIC REGULATION

William Phelps Eno, formerly Chairman of the Citizens Street Traffic Committee of New York City. Brentano's, New York. 1920. 100 pp. Illustrated.

A thorough discussion of the details of the regulation of street traffic, with proposals for the satisfactory solution of the problems.

CIVIC PAGEANTRY

"The Smith, A Civic Pageant," by Thomas Wood Stevens. Printed in "The Survey" for March 5, 1921. This pageant was presented for the twenty-fifth anniversary of the Civic Club of Allegheny County by the School of Drama of the Carnegie Institute of Technology, Pittsburgh. (Apply to "The Survey," 112 East 19th Street, New York City.)

RECREATION PUBLICITY

"Pioneering for Play." 1921. 61 pp. Illustrated. Suggestions for arousing public interest in community recreation. There are large numbers of persuasive anecdotes and quotations, and examples of effective posters. (Apply to Community Service, 1 Madison Avenue, New York City.)

PLAYGROUND WORK IN CHICAGO

"What We Did on a Summer Playground in Chicago," by Genevieve Turner Holman. Reprinted from "The Playground" of June, July, and August, 1920. 19 pp. Suggestions for activities on any playground for small children. (Apply to Playground and Recreation Association of America, 1 Madison Avenue, New York, N. Y.)

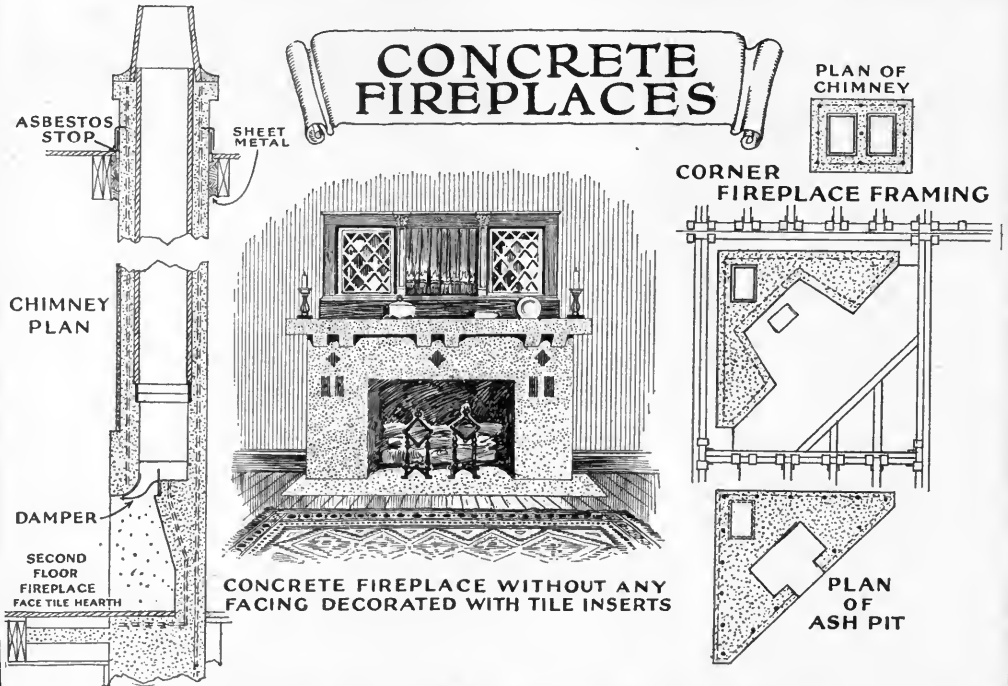
The publications listed above are for sale by their publishers. Those in the following list are understood to be free upon application.

RURAL RECREATION

"Rural and Small Community Recreation." Suggestions for utilizing the resources of rural communities. Published by Community Service, 1 Madison Avenue, New York City. 1920. 139 pp. This booklet tells how in many instances the people of rural districts have come together, at first for purely economic reasons or for causes growing out of community needs and prob-

lems, and later because of the satisfaction which they have found in meeting as neighbors. With these experiences it offers simple suggestions for neighborhood gatherings, and tells of some of the facilities which may be utilized in making neighborliness count in the life of the community. The chapter headings are suggestive of the contents: Recreation in the Home; Play and the Country School; Suggestions for the Organization

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The above illustrations give an idea of the practical suggestions offered by the ALPHA Blueprint Service Sheets and Special Bulletins, which cover the following concrete improvements:

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Foundation and Hatchway	Manure Pit	Hog House	Coal Pocket
Gutter and Curb	Septic Tank	Storage House	Post and Walls
Storage Cellar	Oil Storage Tank	Poultry House	Walls, Sills and Lintels
Small Warehouses	Tennis Court	Dipping Vat	Garages and Runways
Overcoating of Old Dwellings	Concrete Chimneys and Fireplaces		Warm Weather Concreting

If you live east of the Mississippi ask for the ALPHA handbook on concrete construction, a free copy of the Sheet or Bulletin that interests you most, and for a copy of ALPHA AIDS, our magazine. We are obliged to ask those living out of our sales territory to send 50 cents to cover printing and mailing expense. Mention *American City*.

ALPHA PORTLAND CEMENT CO., General Offices, Easton, Pa., Chicago, Ill.

Sales Offices: New York Boston Philadelphia Pittsburgh Baltimore Savannah Bellevue, Mich. Ironton, Ohio

Concrete for Permanence

of a Field Day and Play Picnic for Country Children; The Rural Community Center; Recreation for the Whole Community; Art Expression in Rural Communities; Suggestions for Organization and Leadership. The detailed suggestions and bibliography in the Appendix will be found of practical value. (Apply to publishers.)

MUNICIPAL FINANCES

"Financial Statistics of Cities Having a Population of Over 30,000." Published by the Bureau of the Census, U. S. Department of Commerce, 1921. 355 pp. Complete statistics, with graphic representations of all the financial affairs of cities having a population of over 30,000 in 1919. It takes up in detail the revenues and expenditures of cities, also of municipally owned public service enterprises, with analyses of indebtedness, both net and gross. The introductory pages on municipal accounting will be found most instructive and valuable. (Apply to Sam L. Rogers, Director of the Census, Department of the Commerce, Washington, D. C.)

COMMUNITY GOVERNMENT

"Community and Government." A manual of discussion and study of the newer ideals of citizenship. By Howard W. Odum, Ph.D., Professor of Sociology. Published by the University of North Carolina as an Extension Leaflet, Vol. IV, No. 5, January, 1921. 106 pp. The work treats of government and social problems of towns and cities, of county, villages, and the open country, the government and public service of the state, and of "The Real Problems of Americanization." This manual is designed to be of especial use to school officials and teachers, county agents, state, county, city, and town officials, ministers, and all others interested in government and community service. (Apply to Professor Howard W. Odum, University of North Carolina, Chapel Hill, N. C.)

MUNICIPAL REPORT FOR CLEVELAND

"The People's Business in the Fifth City." Facts about the affairs and activities of the city of Cleveland for 1920, compiled and edited by M. F. Bourjaily, Commissioner, Bureau of Information and Research. 48 pp. Illustrated. Instead of the usual formal and uninteresting annual report, Cleveland has published "a plain statement of the manner in which the people's business was managed and their money spent during the year 1920." Such a report goes far toward stimulating civic interest. (Apply to M. F. Bourjaily, Commissioner, Bureau of Information and Research, Cleveland, Ohio.)

SOCIAL SERVICE.

"The College and the Local Community," by Seba Eldridge, Professor of Economics and Sociology at Rockford College. 8 pp. 1921. Reprinted from the January-February number of "School and Home Education." The pamphlet describes the manner in which the Social Science Department of Rockford College has rendered service to the community in which it is located, and offers suggestions that can be readily followed by other colleges. (Apply to Professor Seba Eldridge, Rockford College, Rockford, Ill.)

FIRE PREVENTION

"Structural Defects Influencing the Spread of Fire." Suggestions for their elimination and protection. 1921. 18 pp. Prepared by the Committee on Manufacturing Risks and Special Hazards, of the National Fire Protection Association. (Apply to National Fire Protection Association, 87 Milk Street, New York, N. Y.)

HEALTH CODES

"A Model Health Code for Cities." Preliminary Report of the Committee on Model Health Legislation of the American Public Health Association. 1921. 8 pp. (Apply to the American Public Health Association, 169 Massachusetts Avenue, Boston, Mass.)

Municipal Reports

Los Angeles, Calif.—Annual Message of Meredith P. Snyder, Mayor. January 3, 1921. (Apply to Meredith P. Snyder, Mayor, Los Angeles, Calif.)

Middletown, Conn.—Fifty-fifth Annual Report of the Board of Water Commissioners. For year ending December 31, 1920. (Apply to George C. Moore, President, Middletown, Conn.)

Mishawaka, Ind.—Controller's Report for year ending December 31, 1920. (Apply to Walter Michael, City Controller, Mishawaka, Ind.)

ECONOMIC ASPECTS OF TOWN PLANNING

"Municipal and Real Estate Finance in Canada," by Thomas Adams, Town Planning Adviser to the Commission of Conservation. 1921. 15 pp. A careful examination into the economic and financial side of town planning and real estate development in Canada. (Apply to author, Ottawa, Ont.)

SAFETY EDUCATION

"Course of Study for Safety Education in Oregon Schools." Issued by J. A. Churchill, Superintendent of Public Instruction for Oregon. 1921. 62 pp. Illustrated. Detailed presentation of safety instruction for grade schools. (Apply to J. A. Churchill, Superintendent of Public Instruction, Salem, Ore.)

VACANT LOT GARDENS

Twenty-fourth Annual Report of the Philadelphia Vacant Lots Cultivation Association, for the year 1920. 24 pp. Illustrated. (Apply to John K. Snyder, Superintendent, 1524 Land Title Building, Broad and Chestnut Streets, Philadelphia, Pa.)

HEALTH CONDITIONS IN CONNECTICUT

Second Biennial Report of the Commissioner, Connecticut State Department of Health, for period ending June 30, 1920. 42 pp. Diagrams. (Apply to John T. Black, M.D., Commissioner of Health, Hartford, Conn.)

A HEALTH ALMANAC

1921 Almanac of the Louisiana State Board of Health. 32 pp. Illustrated. Contains the information usual to Almanacs, together with much practical information on health and sanitation. (Apply to Dr. M. W. Swords, Secretary, Louisiana State Board of Health, New Orleans, La.)

UTILITY RATES IN KANSAS

Two pamphlets compiled and mimeographed by the Municipal Reference Bureau of the University Extension Division of the University of Kansas. February, 1921. One (57 pp.) gives the water rates in 161 Kansas cities, together with a directory of all the waterworks plants in the cities of Kansas; the other (57 pp.) Bulletin No. 25, Electric Light and Power Rates in 259 Kansas Cities. (Apply to John G. Stutz, Secretary, League of Kansas Municipalities, University of Kansas, Lawrence, Kansas.)

CITY PLANNING

"Recreation Facts About Burlington, Iowa." This report with its recommendations for parks and playgrounds is part of a general city plan for Burlington. (Apply to Dr. Harry W. Harner, General Chairman, City Planning Commission, Burlington, Iowa.)

CHURCH PROPERTIES

"Appraisal and Advisory Service for Churches." 9 pp. The pamphlet is devoted to an outline of certain financial and social problems encountered by St. Mark's in the Bowery (New York) through the changing character of the surrounding neighborhood, and to the manner in which they were met and solved. (Apply to the United States Mortgage and Trust Company, 55 Cedar Street, New York City, N. Y.)

FLIES

"The Fly," by George W. Simons, Jr., Chief Sanitary Engineer. 11 pp. Illustrated. This booklet on the fly as an enemy to humanity is adapted to the uses of children in schools and also to the interests of adults.

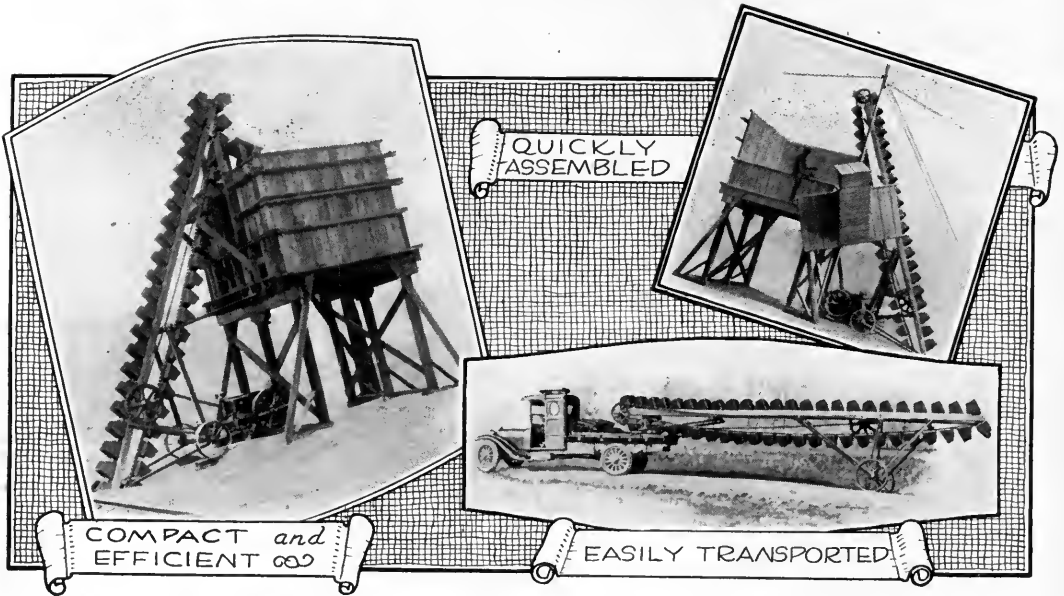
PUBLIC HEALTH

"The Michigan Health Almanac, 1921." The January number of "Public Health," published by the Michigan Department of Health, Lansing, Mich. 32 pp. Contains the usual features of an almanac, with a great deal of practical information and advice on health and sanitation. (Apply to the Michigan Department of Health.)

New Bedford, Mass.—Annual Report of the Chief Engineer of the Fire Department for year ending December 31, 1920. (Apply to Edward F. Dahill, Chief Engineer, Fire Department, New Bedford, Mass.)

San Diego, Calif.—Report of the City Auditor for the fiscal year ending December 31, 1920. (Apply to H. L. Moody, City Auditor, San Diego, Calif.)

Springfield, Ill.—Fourth Annual Report of the City Water Light and Power Department for year ending February 29, 1920. (Apply to Willis J. Spaulding, Commissioner of Public Property, Springfield, Ill.)



A MACHINE FOR REDUCING HIGHWAY TAXES

The Fairfield Portable Car Unloader for handling Sand, Gravel, Slag, or Crushed Stone.

THIS machine effects a remarkable economy in road construction work. It will show a net saving of \$8.50 to \$9.50 in labor on every 50 ton car unloaded. Does the work of 20 to 30 hand shovelers.

Unloads from hopper bottom cars directly into an elevated bin from which material is dropped onto the truck or wagon.

Does not require skilled labor; is operated by one man; is built for heavy duty and long service with

practically no expense for upkeep.

This equipment is quickly erected or knocked down and easily transported. Outfit complete as illustrated includes elevator; track feeder; sectional storage bin and 8 H.P. Kerosene engine.

Write for price and circular giving complete specifications.

THE FAIRFIELD ENGINEERING CO.
Lancaster, Ohio



FAIRFIELD
CONTRACTORS MACHINERY



Methods, Materials and Appliances

News for Boards of Public Works, Engineers, Contractors, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

Motor-Cycles Combat Crime Wave

The use of motor-cycles by police departments throughout the United States is increasing rapidly, because of the facility with which these machines—with or without side-cars—can operate. The state of Maryland is installing 20 electrically equipped Harley-Davidson machines for state police service. The functions of this department of the state will be along the same lines as those of the now famous Pennsylvania mounted state police organization. The officers for this service are now undergoing an intensive training in the care, operation and handling of their mounts. In connection with the agitation for an extensive state police organization in the state of Ohio, Police Chief Herbert, Toledo, Ohio, pointed out in a talk before the officials of that city: "The police department has not progressed as the crook or lawbreaker has in the use of high-powered machines, and we find ourselves utterly outdistanced on all calls where speed is the main requisite." This seems to be a problem which the police officials in small hamlets as well as metropolitan cities

have suddenly become aware of, and they are either installing motor-cycles or augmenting their present equipment with additional machines.

During the year 1920, the Harley-Davidson Motor Co., Milwaukee, Wis., delivered motor-cycles in quantities varying from 1 to 70 machines to 355 villages, cities, counties and states for police use. Since January 1, 1921, the proportion of sales to police departments has even increased. A partial list of the places purchasing motor-cycles for police duty since that date, is: Pittsburgh, New Orleans, North Denver, Williamsport, Pa., Akron, Nashua, N. H., Forest Hills, Pa., Elmira, N. Y., Little Rock and North Little Rock, Ark., Johnson City, Tenn., Portland, Washington County and Columbia County, Oregon, Sacramento and Sacramento County, Calif., Baltimore, Oshkosh, Wis., Plainfield, N. J., San Diego, East San Diego and San Diego County, Calif., Orlando, West Palm Beach and Miami, Fla., Chatham and Muskogee Counties, Griffin and Madison, Ga., Winston-Salem, N. C., Alexandria, Va., Spokane, Wash., the state of Maryland, Milwaukee, Wichita Falls, Tex.



ONE OF THE FINEST POLICE FORCES IN THE WORLD—THE PENNSYLVANIA STATE POLICE, WITH MOTOR-CYCLE EQUIPMENT



"The Kid"

Have You Seen Him?

You say—Yes!
We say—No!

*You only saw his picture —
his reproduction!*

It cost many thousands of dollars to make this picture and probably few people saw the original action. Yet by means of an *Up-To-Date Reproduction Process* the full value of the picture is available to many at small cost.

CITY ENGINEERS

spend thousands of dollars in preparing their maps. They, too, can make these generally available at a reasonable cost by means of *Up-To-Date Reproduction Processes*. Lithoprinting and Autoprinting are those processes that are most important to City Engineers and others in the preparation and reproduction of maps and drawings.

LITHOPRINTS

are black and white reproductions on paper, cloth or tracing cloths from any original capable of being blueprinted. They are permanent and true to scale. They will not fade, crack or become brittle. They look like lithographs and cost like blueprints.

AUTOPRINTS

are enlargements or reproductions of Tracings, Maps, Drawings, Printed Matter, Photographs or anything that can be photographically reproduced. They can be made in any size up to 40"x60" in clear black on white, in any scale you may desire and at a cost of only 50 cents per square foot.

The Lithoprint Company of New York, Inc., is today solving the Assessment Map Problem for many of the large cities of the country. Based on our wide range of experience we have prepared a booklet, "Assessment Maps: Their Construction and Upkeep", which will be sent free upon request.

LITHOPRINT COMPANY

OF NEW YORK, INC.

41-43 Warren Street

New York City

Automatic Cut-out for Series Incandescent Street Lights

Since the establishment of series incandescent street lighting as an economical means of city illumination, there has been a demand for a simple, sure-working cut-out. Different forms have been tried, with various success, all built around the principle of the voltage puncturing a specially treated insulator when the current ceases to flow through the lamp filament. The principle has never been at fault, but the mechanical means of realizing it have been at times crude and unfinished.

The General Electric Company, Schenectady, N. Y., has developed and is marketing a magazine cut-out which overcomes the objections to the older styles. It consists of a capsule containing a roll of dielectrically treated fabric. This compact, water-proof capsule is inserted in the opening between the clips of a standard G-E series socket. A short length of the fabric is first drawn out of the capsule between the clip faces. When a lamp burns out, the film at once punctures, closing the shunt circuit and allowing the other lamps to burn on without interruption. The old devices very often punctured, cutting out the lamp without cause, or refused to puncture at the right time, thus plunging a section of the city into darkness.

Renewal by the lineman is a simple matter with the new cut-out. He removes the socket, separates the clips, and, pulling out the punctured section of film, tears it off. His fingers, often oily and dirty, never come in contact with the new section of film which has been pulled into place. There is no groping in the pockets for the old insulating discs or rings, often rendered useless by dampness or dirt, nor is there the temptation to insert a bit of tape, a match, or other foreign substance, between the clip faces when the right material is not at hand, a procedure which in the past has often raised havoc with lighting circuits.

Another marked advantage of the new magazine film cut-out is its exceptionally long life. Allowing three burned-out lamps a year, the cut-out with its fifteen dielectric surfaces is good for five years' service.



A NEW SAFETY DEVICE WHICH MAKES SERIES INCANDESCENT STREET LIGHTS MORE DEPENDABLE

Changes in Pittsburgh Meter Offices

The Pittsburgh Meter Company, East Pittsburgh, Pa., has recently announced changes in the personnel and location of its district offices in New York, Seattle and Kansas City. On May 1, the New York office was moved from the Singer Building, where it has been located for the past 15 years, to the 19th floor of the Hudson Terminal Building, 50 Church Street, New York City. V. E. Arnold, the District Manager, will be located at that address. The Seattle office has recently been moved from its former location to Room 201, Railway Exchange Building, with District Manager H. I. Miller in charge. Charles R. Zeskey has been appointed District Manager of the Kansas City office, succeeding R. M. Stotler, who resigned on April 1. The Kansas City office is located in the Mutual Building, Kansas City, Mo.

MUSHROOM TRAFFIC LIGHT



BRILLIANTLY LIGHTED AT NIGHT

NO UPKEEP COST

CAST STEEL

NO REPLACEMENTS

WRITE FOR BULLETIN

ELECTRICAL & SPECIALTY SUPPLY CO.

Madison Terminal Bldg., CHICAGO, ILL.

THE OTTERSON AUTO-EDUCTOR CLEANS CATCH BASINS Saves Time—Money—Labor



Mounted on any 5-TON Chassis of suitable standard make.

THE OTTERSON AUTO-EDUCTOR CO.

SPRINGFIELD, OHIO



SECTION OF METER SHOWING NEW METHOD
OF PROTECTING GEARS

Improved Meter Construction

During the past quarter-century, water-meter design and construction have been advanced to a point where satisfactory service is rendered over such unusually long periods that it is hardly considered possible to make any further improvement. If a water meter could always be run under laboratory conditions—that is, in pure water, this would be true. But the average water-supply is far from pure when considered from the standpoint of the engineer. It may carry nothing whatever that is harmful to the human mechanism, but this is not the case where the meter mechanism is concerned. Many water-supplies are strongly alkaline; a few give a slight acid reaction; still others carry more or less sand or gritty matter in suspension. A fourth and a fifth class may be mentioned as well: those which are alkaline and carry sand; and those which are acid and carry sand. These two are naturally the most destructive to the gear train of a water meter. The alkali or acid corrodes the spindles and gears, while the grit tends to wear them out rapidly.

To overcome these disadvantages, the manufacturers of the Trident meters, the Neptune Meter Company, 50 East 42nd Street, New York City, have brought out an improved type of meter in which the water is not only prevented from reaching the spindles and gears of the gear train but also embodies the further important improvement of permitting the gear train to operate constantly in a bath of lubricant. This is made clear in the accompanying phantom view of a five-eighth Trident meter, which shows the flanged disc forming the bottom plate of the gear train and fitting

snugly against the machined surface of the inside of the casing, thus making a tight joint. In assembling, the gear train is filled with a special lubricating compound so that the gears and spindles constantly operate in a bath of lubricant, and friction is practically reduced to the vanishing point, while the protection afforded guarantees that the meter will operate as accurately after many years as it did when first installed. It is proof against both corrosion and wear.

Owing to the great number of meters already in service, the value of an improvement of this kind would be lessened unless it was made interchangeable for old as well as new meters. This has been accomplished by making it adaptable to all the Trident meters up to one-inch now in service, by a washer which fits between the shoulders of the disc and forms an equally water-tight joint in the older types of meters. The great importance of this step in advance will be readily appreciated by all water-works superintendents who have had to combat the effect of corrosive water carrying more or less fine sand or grit in suspension. It will undoubtedly cut down inspection and repair cost substantially while maintaining revenue at the maximum.

The Development of the Naperville Nurseries

The Naperville Nurseries is an Illinois corporation, incorporated in 1915, to take over certain individual business interests of F. W. von Oven, H. von Oven and E. von Oven, all heirs of the former Ernst von Oven, deceased (1906) nurseryman, who was the originator of the nurseries at Naperville, before the Civil War.

The nurseries are located adjacent to the city of Naperville, in the highlands of DuPage County, about 28 miles west of Chicago on the Chicago, Burlington & Quincy Railroad and several miles distant from the Elgin, Joliet and Eastern Belt Line.

During the last ten or twelve years the main output of the nurseries has been ornamental shrubs, trees, evergreens, and perennials, besides a general supply of lining-out stock for the nurserymen and florists' trade. The growing of this lining-out stock was instigated by the President, F. W. von Oven, some twelve years ago, in the hope of producing better lining-out stock in a number of varieties than was procurable abroad. Since the Federal Horticultural Embargo No. 37 has gone into effect, the demands as well as the output of this department have been greatly increased. Aside from the lining-out stock, the nursery sells to the general wholesale trade and also caters to a limited retail trade. Most of the nursery stock is either hardy or indigenous to the Great Lakes region.

The nurseries cover 125 acres in ornamental shrubs, trees, evergreens and perennials, and handle a general line of nursery stock for retail trade and also for parks, cemeteries, forest preserves, and general landscape developments.

City traffic demands more efficient regulation --- simple methods, for both day and night, are now at hand.



Floodlights Clear Up Traffic Trouble

THE night handling of city traffic, once a difficult and perplexing problem, has been greatly simplified by the use of the G-E Floodlight. Mounted on small towers it blinks its signals to the traffic; or secured to nearby buildings, it throws its beam of light on the traffic officer, making his movements visible to all.

This surety in signaling traffic movements lessens jams and tie-ups. It allows a fast moving traffic stream at night with greatly reduced danger of accident.

The General Electric Company's experience in installing floodlights for traffic regulation is at your service. Submit your problems. They will secure careful attention.

General Electric Company
General Office
Schenectady, N.Y. Sales Offices in
all large cities 35C-70

Reproducing City Maps and Tracings

The need for a reproduction process which makes it possible to procure a limited number of true-to-scale ink prints on any material at a reasonable cost has long been evident.

With a view to meeting this need, the Litho-print Company of New York, Inc., 41-43 Warren Street, New York, has during the past ten years developed in the laboratory and operated commercially the Lithoprint process. This process is a simplified form of lithography in which it is possible to reduce the high make-ready cost. A plate coated with a special composition replaces the lithographer's stone, and the etching is obtained by a simple process of contact printing. Lithoprints very closely approximate lithography in appearance, though they sell at a price comparable to that of blueprints.

Some years ago it came to the attention of many manufacturers, shipbuilders, railroad companies and others that Lithoprints would meet the specifications of various governmental departments, which require the filing of ink drawings in connections with government contracts, valuations, etc. These firms readily took advantage of this economical means of obtaining ink prints and extended its use to cover their other reproduction needs where accuracy and permanency are essential. It is only recently, however, that the advantages and economies of this process have been brought before engineers and municipal officials generally throughout the country.

The process is particularly adapted to the preparation and maintenance of maps used in the various city departments. A concrete example of this was the recent preparation of nearly 50,000 square feet of Lithoprint maps to serve as the basic maps for all the various city departments of one of the eastern cities of approximately 100,000 population, to meet the requirements of the various bureaus and departments. Twenty copies of each map were obtained; 18 of these were on heavy white cloth and 2 were on tracing cloth. The maps prepared on the heavy white cloth were used by the various departments as their basic maps, and those prepared on tracing cloth replace the originals for reference use, blueprinting, etc., thus making it possible to file the originals away as a safeguard against wear, damage or fire.

These maps, which are more commonly known as assessment or property maps, are absolutely necessary in the Departments of Assessment, Taxation, and Tax Arrears, etc., and their uses here are more or less obvious. Changes of property condition are made on the reproduced map in colored ink, one color for each change. When these changes become confusing on the reproduction, the original tracing is changed once and a new reproduction prepared. The old reproduction, which shows chronologically the record of these changes, then becomes a permanent record, while the original, which has not been dam-



REMOVING THE PRINT OF A MAP FROM THE TABLE

aged by this one change, is put back in the file for safe keeping. In connection with the other departments, such as the Bureau of Sewers, Bureau of Water, Department of Public Works, the reproductions form the basic maps upon which are indicated the location and size of sewers by the Bureau of Sewers, the location of water-mains by the Bureau of Water, etc.

Maps of this nature are, of course, of great value to real estate companies, insurance companies, and gas companies, but their greatest value lies in the fact that there is one and only one official map of the city which is the first and last word in all matters in the city requiring an accurately reproduced city map for reference or record.

Wood Pipe Export Offices at San Francisco

The Wood Pipe Export Company, 523-524 White Building, Seattle, Wash., has opened a new office at 775-777 Monadnock Building, San Francisco, Calif., in order to avail itself of the export facilities afforded by San Francisco. Thus it will be better able to serve all foreign purchasers of redwood and Douglas fir wood pipe, which are used quite extensively in many communities for main-line water pipes.

Davies Leaves Goodyear

I. E. Davies, recently in charge of the Municipal Division of the Fleet Sales Department, Goodyear Tire and Rubber Company, Akron, Ohio, has severed his connections with that company. Mr. Davies has always taken a personal interest in the practical application of the tire types in fire department service, appreciating the problems and difficulties of the fire chief. He is well-known among municipal and fire department officials for his excellent discussions and papers read at various convention. He has been a prominent figure in the sales of tires to municipalities, and it is expected that very shortly he will make new connections which will continue his excellent work in this field.

A Street of King Standards



*When you think of Street
Lighting... think of King*

KING MFG. CO.

53 W. Jackson Blvd.

CHICAGO, ILL.

A Small-Town Fire Engine

The city of Corinth, Miss., whose 1920 population is 4,946, has found its fire engine, depicted below, manufactured by the Waterous Fire Engine Company, St. Paul, Minn., a dependable unit. In January of this year, the Hon. T. E. Henry, Mayor, stated in a letter that the Waterous engine was used three hours on a fire, it worked perfectly and maintained adequate pressure.

In the Waterous fire engine one motor does all the work. The power-plant is a standard Ford chassis, making available the local Ford service in any town, obviating any necessity for going out of the town for repairs or spare parts.

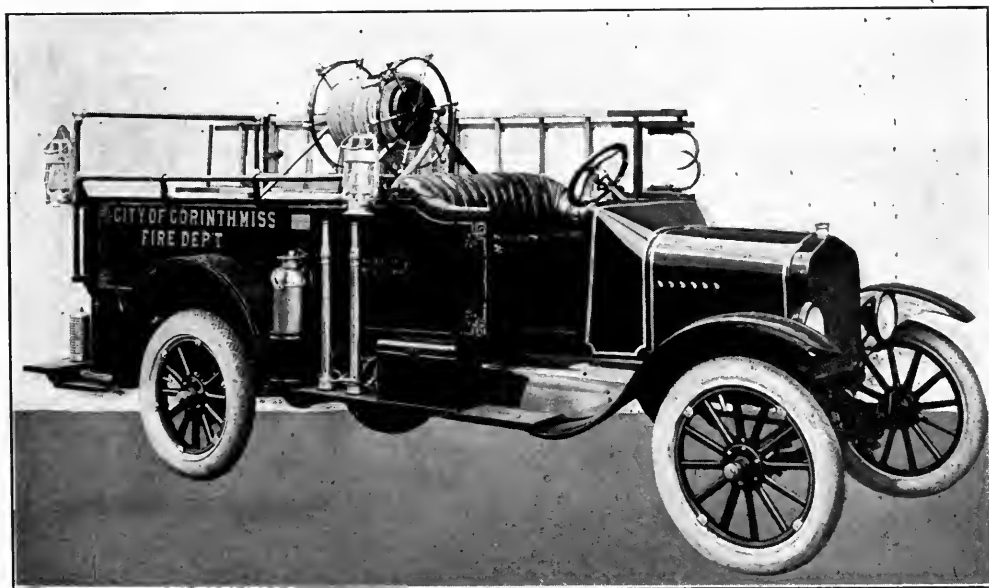
By simply throwing a lever, at the driver's seat, the full power of the motor is immediately transferred from the drive wheels of the truck to the pump and from the pump back to the drive wheels. In each case, after the shift has been made the mechanism is securely locked, there being no possible chance for the operator's becoming confused. All the pump parts and mechanism are standard and interchangeable. The hose body has a capacity of 800 feet of 2½-inch fire hose, and is provided with suitable bracket for carrying a 20-foot extension ladder, the sections of which may be used as single or roof ladders. The chemical tank contains 35 gallons of chemical mixture and is provided with 150 feet of ¾-inch chemical hose. It utilizes the pressure of the fire pump to throw the chemical on the fire.

Most small cities with water-works systems have low water pressure, averaging from 40 to 50 pounds per square inch, and this pres-

sure is altogether too low to permit of effective work when fighting a serious or bad fire. This pumper can act as a booster and run the fire pressure up to 100 pounds or more, increasing the efficiency of the fire streams by 100 per cent, and enabling the firemen to throw the water in greater volume, to a greater distance, and with much more effect. This reduces the fire losses and keeps down insurance rates. The equipment is very complete and its triple combination design makes it valuable for service as a pumper, a hose-cart, a chemical engine or a ladder truck. When fully loaded its road speed is 5 to 25 miles per hour, net weight 3,300 pounds.

Water-Works Improvements in Harrodsburg, Ky.

The preparation of plans and specifications for the improvement of the water-works of Harrodsburg, Ky., have been started by Pearse, Greeley and Hansen, Consulting Engineers, Chicago, Ill. The work involves not only the preparation of plans and specifications but the supervision of construction, covering the remodeling and lengthening of an existing stone masonry dam 10 feet high and 150 feet long, and the installation of a filter plant with a capacity of 600 gallons per day, the installation of low-lift and high-lift electrically driven pumping equipment, the laying of approximately one mile of 4-inch main, and minor repairs and additions to the municipal electric lighting plant, possibly including the installation of a 200-kw. hr. A. C. generator. Plans are being rushed in order that construction work may be completed during the present year, if possible.



A WELL-EQUIPPED FIRE FIGHTER FOR SMALL TOWNS

THE AMERICAN CITY

MIAMI, FLORIDA



Twelfth St. Day View

ELRECO COMBINATION RAILWAY AND LIGHTING POLES add prestige and dignity to the Magic City of the South. This design of pole and General Electric Lighting Unit was adopted because—it makes separate lamp standards unnecessary, keeps the curb lines free from a multiplicity of posts. No expensive underground construction for lighting circuit is necessary; these wires being attached to top of pole, permits removal of unsightly wooden poles, and in addition poles will also support the span wires of the new Street Railway Company.

One ELRECO pole for all service.

What other cities have accomplished also is shown in our Catalog F-2 sent on request.

THE ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
NEW YORK OFFICE—30 CHURCH ST.

Loading Device for Street Departments

Mechanical means of loading gravel and crushed stone and other loose and heavy material are imperative for street and highway departments in view of present labor costs, in spite of their slight reduction. The use of motor trucks has also brought about a condition which makes hand labor almost out of the question, because trucks must be kept in motion to be an economical part of the equipment of any street department or contractor. Under present conditions the demand is for large quantity and quick handling. The investment in trucks and other equipment is such as to demand speed and volume. Hand methods are archaic and not to be retained where machinery can be used to advantage.

Conant gravel sand loaders, manufactured by the Conant Machine Company, Concord Junction, Mass., are thoroughly developed machines, constructed of standard parts which are especially designed for this work and tested with a wide margin of safety for the severest strains required under actual working conditions. They consist of a frame structure as illustrated, staunchly built of angle-bars and strongly braced and reinforced with gusset-

plates at the corners. All intersections are hot-riveted, insuring firm joints. Wheels and running gear are usually of metal, but wood wheels for safe towing of machines long distances are sometimes furnished.

The elevating frame of the folding or collapsible loader is pivoted on a heavy shaft, enabling it to be lowered to go under 7½-foot beams or to be not of too great height when loaded aboard a truck for transportation to some distance. The weight of the machine with the motor is 3,800 or with an engine 4,300 pounds. It is equipped with twenty 16 x 10-inch, low-front malleable iron buckets with case-hardened digger teeth. The overall height of the machine is 13 feet, the length 9 feet, 6 inches, height of discharge from chute about 8 feet, wheels 50 inches and 25 inches high, 4-inch tread, and is made to dig at three levels, ground level, and 4 and 8 inches below ground level.

The State Highway Commission of Maine has nine of these machines in operation.

The George A. Johnson Company, Inc.

George A. Johnson, well-known hydraulic engineer, has just announced the reorganization of Johnson & Benham, Inc., under the new name of the George A. Johnson Company, Inc., the members of which are George A. Johnson, Nelson B. Wolfe, Harold C. Stevens, and Charles R. Wyckoff. This company engages in the professional practice of civil, electrical and mechanical engineering, particularly in water-supply and purification, sewerage and sewage disposal, refuse disposal, electric light, heat and power development and distribution, industrial plants, railroads and harbor improvements. Their services include investigations and reports, expert testimony, valuations, rate cases, designs, supervision of construction, supervision of operation, and the management of public utilities.

Patented Pavements Now Permissible in Illinois

Under a decision recently handed down by the Supreme Court of Illinois, an act passed by the Illinois State Legislature in 1919 regarding patented pavements was declared unconstitutional. Prior to that year the use of patented pavements by the several cities of the state had been prohibited under the Supreme Court decision of the then existing law. The Legislature then passed an act permitting the municipalities to contract for patented pavements provided they were placed in competition with unpatented pavements. A taxpayer brought action to restrain the contract made by one of the cities including Warrenite Bitulithic pavement, patented by Warren Brothers, Boston. The case has been in court for two years and now a unanimous opinion is against the plaintiff taxpayer on all points and sustains the decision rendered by the County Court more than a year ago.



LOADING FINE GRAVEL INTO ONE CART,
STONE INTO ANOTHER

Ornamental Street Lighting Pays

1. The merchant—brings him the crowd in a buying mood
2. The resident—makes streets more attractive and safer
3. The property owner—attracts tenants, and makes them good tenants.
4. The municipality—increases valuations, fosters civic enthusiasm, and advertises the city.

Alba Globes

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The Selection of Municipal Water-Works Pumps*

By W. F. Schaphorst, M. E.

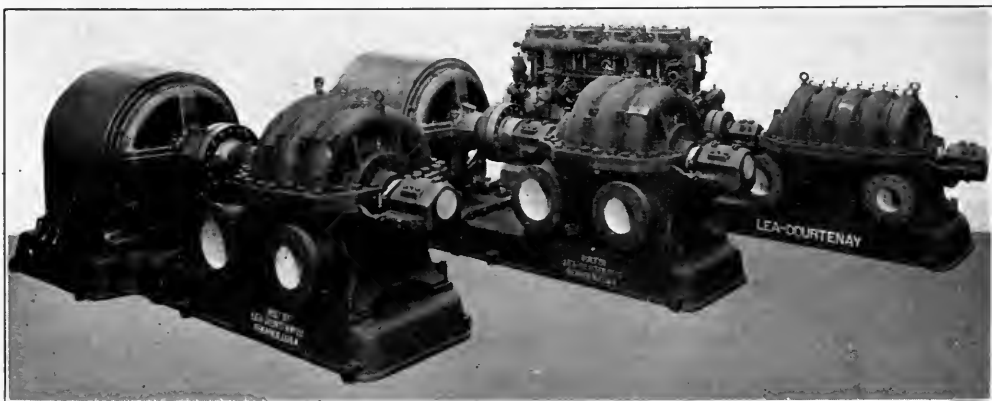
PRIOR to ten years ago the reciprocating pumping engine held all pumping records. It was thought that to secure highest efficiency slowness of action was necessary so that the water would not be violently agitated. Most of these pumps were driven by Corliss engines, also slow-moving, and also giving their highest efficiencies when operating at low speed.

Once the steam turbine got started in surpassing the Corliss engine in efficiency, however, ways and means were sought in which to connect the turbine to a centrifugal pump. The difficult point to overcome was the coupling of a high-speed turbine to a comparatively low-speed pump, because a steam

turbine operates at its one best efficiency when running at high speed, and a centrifugal pump has its definite best speed also, depending upon its design, but that speed is never as high as the speed of a steam turbine.

The mechanical device that must be given principal credit for this achievement is the double-helical, speed-reducing gear. This gear has been perfected to such a degree that it now commonly shows a mechanical efficiency of 98½ per cent or better. A number of manufacturers are now building high-speed motors which can be connected directly to centrifugal pumps. The electric motor possibly has had as much to do with the development and success of the centrifugal pump as has the steam turbine.

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THREE OF SIX CENTRIFUGAL PUMPS PURCHASED BY THE CITY OF IRONWOOD, MICH.

Two of these pumps are motor-driven; 600 h.p., 2,100 gallons per minute, 1,750 r.p.m., against a 650-foot head. The third is driven by an internal combustion engine, 1,200 r.p.m., 950 gallons per minute against a 580-foot head

The Reciprocating Pump

The reciprocating water-works pump, to be sure, has its own advantages, but they are few as compared with the advantages of the centrifugal pump. The four principal arguments favoring the reciprocating type are:

1. *Flexibility.*—The capacity of a reciprocating pump can be increased by simply speeding it up.

2. *Head.*—A reciprocating pump can pump against almost any head. It is a comparatively easy matter to design the cylinder walls heavy enough to withstand any ordinary pressure.

3. *Efficiency.*—Regardless of speed or head, the efficiency of the reciprocating pump does not vary greatly.

4. *Mechanical efficiency.*—The mechanical efficiency of reciprocating pumps, especially large pumps, is high. For example, tests on five large triple-expansion, vertical-engine pumps equipped with cranks and fly-wheels showed efficiencies of 90.8, 89.5, 89.8, 94.9 and 95.4 per cent respectively. The power required to drive these pumps varied from 600 to nearly 1,200 horse-power. Tests made on two horizontal high-duty, direct-action pumps showed efficiencies of 96 and 95 per cent respectively, and a vertical quadruple expansion fly-wheel engine pump showed a mechanical efficiency of 93.9 per cent. The mechanical efficiency of centrifugal pumps, on the other hand, is seldom greater than 80 per cent.

One modern objection to the reciprocating pump is that it cannot be built in large sizes. It is stated that 1,200 horse-power is about the limit for reciprocating pumps. To build larger sizes, cylinder diameters would be required that are almost impossible to construct. The steam turbine or electrically driven centrifugal pump is not handicapped in this way, as manufacturers would experience little difficulty in building turbine or motor sizes of 5,000 or more horse-power.

Another disadvantage of the reciprocating pump is that the pressure is always positive. Should the discharge valve be suddenly closed, the cylinder heads will be blown out or the piping will burst. By suddenly closing the discharge valve of a centrifugal pump, however, a dangerous pressure is not created in the pump or piping. There is an increase in pressure within the casing and in the piping, but it is only slight. Besides, when this happens, whether accidentally or purposely, the load on the steam turbine or on the motor is much reduced.

Advantages of Centrifugal Pumps

In addition, we have these advantages of the centrifugal pump as compared with the reciprocating type:

1. *Lower first cost.*—A motor- or turbine-driven centrifugal pump frequently weighs only one-tenth as much as a reciprocating pump of the same pumping capacity.

2. *Less space.*—A motor-driven or turbine-driven centrifugal pump reduces the floor space required by 50 to 70 per cent as compared with a reciprocating pump of the same capacity.

3. *Smaller building investment.*—The motor- and turbine-driven centrifugal pump requires a much smaller building than the reciprocating pump, hence a smaller building investment.

4. *Less headroom.*—Less space is required above the pump between the pump and the ceiling. Less air space to heat. Less light required. Lower buildings.

5. *Smaller crane investment.*—Parts are small and comparatively light, consequently smaller and less expensive cranes may be used for handling.

6. *Small, inexpensive foundations.*—There is practically no vibration, and the combined unit is comparatively light, consequently the centrifugal pump can be installed where foundations are otherwise considered soft or treacherous.

7. *Simpler.*—The centrifugal pump is much simpler. It does not contain so many valves, valve gears, cylinders, packings, pistons, piston-rods, plungers or rubbing parts.

8. *No re boring of cylinders.*—There are no cylinders to require re boring.

9. *Few wearing parts.*—Only two important wearing parts—the bearings—which can be quickly replaced at any time.

10. *Lower labor costs.*—The operator has fewer parts to take care of. There is practically nothing to get out of order. The attendance cost in large plants is computed to be about one-half for centrifugal pumps as compared with reciprocating pumps.

11. *Cylinder oil.*—Cylinder oil is not required in the steam turbine or in the centrifugal pump. The bearings are the only parts that need lubrication.

12. *"Slippage."*—It is estimated that in reciprocating pumps "slippage" is usually more than 3 per cent. The average slip is 3 to 5 per cent. Where conditions are unfavorable we may have 10 or even 15 per cent slip.

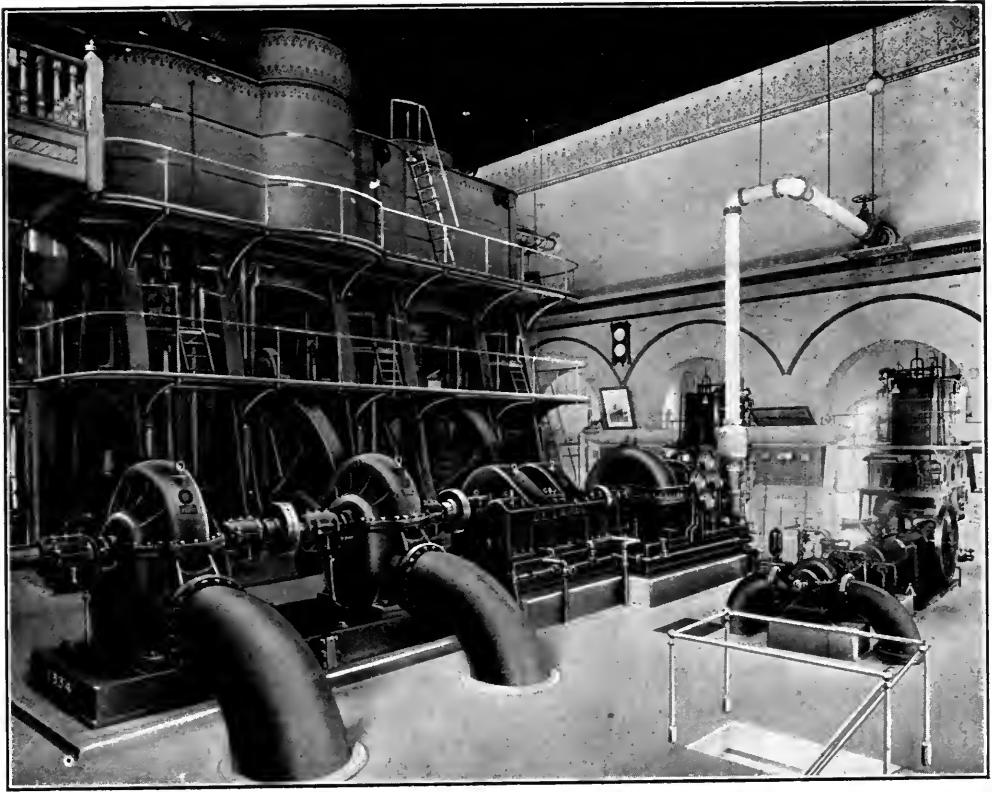
13. *Accessible parts.*—All parts of centrifugal pumps are easily reached. Where horizontal split casings are used, the upper half is quickly removed and all parts exposed.

14. *Quiet operation.*—Because the motion of the principal working part is purely rotary, the centrifugal pump itself is practically noiseless. Where intermediate gears are used, however, especially poorly machined gears, installations are frequently noisy.

15. *Automatic regulation.*—Electrically driven centrifugal pumps can be regulated automatically by means of float and electric switches controlled by the water-level.

16. *Variable speed and capacity.*—Sometimes it is desirable to increase pressure for a short time or to increase capacity. With the centrifugal pump this can usually be accomplished without harm resulting in any way.

17. *No jolts or jars.*—Because of the uni-



THE FLORENCE PUMPING STATION OF THE CITY OF OMAHA, NEBR.

In the background is a reciprocating pump of 20,000,000 gallons capacity, which is not used, but is held in reserve. It has been replaced by the 30,000,000-gallon steam-turbine-driven centrifugal in the foreground, which pumps against a head of 267 feet

form pressure and uniform discharge, there are no sudden jolts in the pipe line.

Water and Fire Service

Sometimes it is best for a municipality to install two centrifugal pumps, one for water-supply and one for fire service. These may be necessary because of the different piping required. They can be so arranged that a single steam turbine can operate both of them. Or it is possible to so arrange the piping that two similar pumps can be operated in parallel against a low head for water-supply. In case of fire where high pressures are necessary, the pumps are operated in series instead of in parallel, thus producing the desired pressure.

Best results are obtained from the centrifugal pump when it delivers into a reservoir or stand-pipe, because it can then maintain a constant head and the pump can be constantly operated at its highest efficiency.

Centrifugal pumps can be operated suc-

cessfully on direct-pressure systems, but not as efficiently as when delivering to a stand-pipe or reservoir. For night service when delivering into a direct-pressure system, it is usually best to install a smaller centrifugal pump, which would be operated at its most efficient speed. In this way efficiencies can be maintained both during the day and at night.

It must be remembered that this article deals only with water-works pumps, hence the reader must not get the notion that turbine pumps are *always* superior to reciprocating pumps, as that is not the case. It is true, though, that the centrifugal pump is gradually widening its application—invading fields that have heretofore been exclusively monopolized by reciprocating pumps.

Other Types of Drive

The writer knows of no instance where a uniflow engine has been used for driving a

centrifugal pump either directly connected or belted. It would be a feasible arrangement, and it has been and is being considered.

Driving a centrifugal pump with a belt, chain, or rope drive from a Corliss, uniflow, or high-speed steam engine, or from a gas engine, water-wheel, hydraulic turbine, etc., is a desirable arrangement in many cases, as, for instance, where the pump must be placed in a position not available for locating a direct-connected engine, or where the speed of the pump is higher than the speed of the engine. The speed of a centrifugal pump is usually greater than the speed of the above-named engines, but is lower than economical speed of a steam turbine.

Sometimes it is found that Diesel engines profitably replace Corliss engines in water-works service. For instance, the city of Appleton, Wis., replaced a Corliss non-condensing steam engine which was connected to two double-acting duplex pumps of 2,000,000 gallons capacity each. These were replaced with two 225-horse-power Diesel engines. Each Diesel engine was directly connected to two double-acting triplex pumps, each pump having a capacity of 2,000,000 gallons per day of 24 hours. As a result, the cost of operation was reduced more than 50 per cent. With the old pumping station it cost 18.9 mills to pump 1,000 gallons of water, whereas with the new pumping station the total cost of 1,000 gallons of water was only 8.6 mills.

Where other kinds of power are not available, centrifugal pumps are sometimes directly driven by gasoline or by gas engines using natural or artificial gas.

Well Pumps and Air Lift

Where water must be obtained from deep wells, difficulty is sometimes encountered in efficiently lifting it into a reservoir or stand-pipe. Three methods are commonly used:

1. *Single-acting, high-pressure plunger pumps* are commonly installed where the well is so deep that the water cannot be sucked from the surface.

2. *The air lift pump.*—Under certain conditions the air lift pump may be considered as a possibility for pumping water out of deep wells. It has the important advantage of having no moving parts whatever, consisting only of a "drop pipe," the lower end of the pipe being submerged in water. Air is then compressed in the bottom of the drop pipe, and air-bubbles are formed, or a mixture of air and water. The bubbles rise upward through

the drop and carry the water upward and out. Where water is dirty or where it contains harmful acids or matter in suspension, the air pump is to be recommended. The efficiency is low and varies from 20 to 60 per cent.

3. *The centrifugal pump.*—This method is usually preferable because of its lower first cost, simplicity, and high efficiency. The centrifugal pump, which in this case has a vertical shaft, is placed at the bottom of the well, the shaft extending to the top, where it is connected to an electric motor or steam turbine, or it may be driven by a quarter-turn belt or rope from a steam or internal combustion engine. If the well is large enough so that the entire pumping unit can be placed at the bottom of the well, so much the better. The more compact the unit, generally, the more efficient. Sometimes vertical-shaft centrifugal pumps are completely submerged in the water. They are not harmed in any way by being so submerged. Also, the motor may be placed in the well at a convenient distance from the pump, far enough from the water-line so that the motor will not be flooded or become wet.

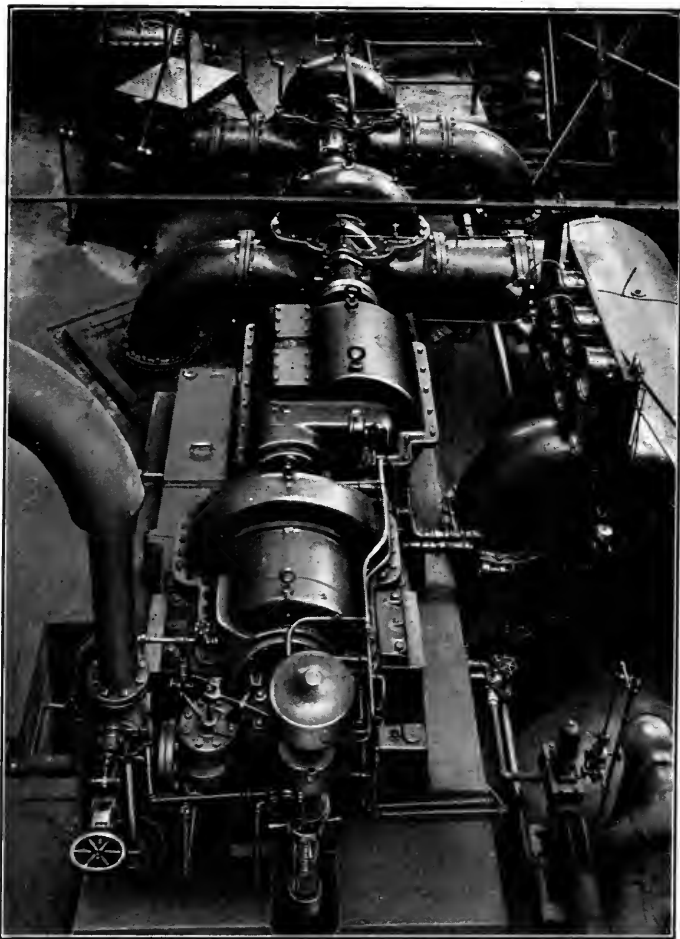
Characteristics

Steam turbines, electric motors, and centrifugal pumps all have "fixed characteristics." The steam turbine, for instance, has a certain best steam pressure and a certain best speed. An electric motor has a certain best speed, amperage, voltage, phase, and cycle, and the centrifugal pump has a fixed best pressure and speed. It is therefore evident that when a centrifugal pump is selected, all conditions should be known in advance, and complete information should be put into the hands of the manufacturer so that the correct combination of turbine and pump, or motor and pump, will be made. The one must be suited to the other.

The type or make of centrifugal pump is not of most importance to the municipality. What the municipality needs most is the pump that will handle the necessary amount of water most economically. The duty of the municipal official, therefore, is to select the pump that will ultimately handle the greatest number of gallons of water per dollar spent by the community.

In writing to manufacturers for prices, the more information they receive, the better. Inform them, for instance, if service is to be continuous or intermittent. How many units do you think you will need? What will be the capacity of each unit? Against what head must the pump work? What will be the approximate suction lift, that is, about how far from the water level

to the centrifugal pump shaft? What will be the approximate variation in both the suction lift and the discharge head below and above the pump shaft? State whether the water is clear or gritty. Does it contain acids? Does it contain solids in suspension? If you already have a motor that you want to use for driving a centrifugal pump, state whether direct current or alternating. Should it be a direct-current motor, give the voltage at the wire terminals. If it is a synchronous alternating motor, name the desired power factor. Also, if alternating current, give the characteristics, namely, phase, cycle and voltage. If you want to drive with kerosene, gas, or oil engines, give the altitude above the sea level. State whether or not you are equipped with a condenser. If so, give the make. Give the temperature, and the amount of cooling water used. If you want to drive the pump with steam, give the present boiler pressure. State whether or not you want to use exhaust steam for heating. Give the degree



A 10,000,000-GALLON-DAILY DE LAVAL PUMPING UNIT, AKRON, OHIO, FILTRATION PLANT

This unit is so designed that it may be driven either by an electric motor or by a steam turbine. Sometimes it is a combination steam-turbine-driven generator and pump

of superheat. And so forth. The information cannot possibly be too complete to receive a satisfactory reply.

Sewer Assessments in Hartford, Conn.

The assessments for sewers in Hartford, Conn., are based upon the actual cost of the work, and the system of applying a uniform flat rate is not used. In the case of trunk sewers and interceptors the city frequently assumes a large portion of the assessment. This portion in some cases represents the excess cost of the sewer over what an ordinary type of sewer would cost the individual owner. Where a large sewer is called

for in order to take care of the storm water from an extensive area, the territory draining to the sewer is charged an outlet assessment, usually levied at so much per acre where no subdivision into streets and lots is on record. In the case of rebuilding an old local sewer, the city usually assumes one-half the cost, and the remaining one-half is assessed against the abutting property.

Grade Separation in Cleveland, Ohio

Authority Reserved to City to Order Grade Separation by Track Depression

By Charles H. Hill

UNDER a state law which compels railroads to carry out grade crossing elimination work at the initiative of a municipality and in coöperation with such municipality, Cleveland has engaged in an effective program of separating grades at intersections of streets and railroads. The city has also been able to order track depression and to preserve residential sections from elevated railroad structures. Only two overhead railroad crossings are outside of industrial or commercial districts.

The Ohio law prescribes that "any municipality may raise or lower, or cause to be raised or lowered, the grade of streets or ways owned by it, within or without its municipal limits, above or below railroad tracks crossing such streets or ways, and may require any railroad company operating a railroad across such streets or ways to raise or lower the grade of its tracks, and may construct ways or crossings above the tracks of any railroad or require the railroad company to construct ways or crossings that are to be passed under its tracks."

The law stipulates that the cost of all construction, including all work and all consequent damages to property, shall be borne 35 per cent by the municipality and 65 per cent by the railroads. This assesses a higher portion of the cost upon the Ohio cities than has been borne in grade separation work by Chicago and Detroit, but it is held that a city can better afford to pay a substantial portion of the cost than accept whatever method of grade separation a railroad may see fit to employ.

In Chicago, for instance, the city has been filled with unsightly elevated track structures, even across boulevards, because of a policy of ready accession to the wishes of the railroads merely to escape all costs beyond the payment of property damages. The division of cost prescribed by the Ohio law, however, applies only to the replacement of existing facilities. If, in effecting a grade separation, a railroad increases its facilities, the cost of such increased facil-

ities is defrayed entirely by the company.

Application Illustrated

An illustration of how this operates is found in connection with work now in progress in Cleveland. A two-track system on a 1-foot cinder ballast is being replaced through the process of track depression and highway viaduct construction with a system providing four tracks in the cut and facilities for eight tracks on all bridges incident to the work, on account of topographical conditions in the Cuyahoga Valley.

The 1-foot cinder ballast is being replaced with a rock ballast 2½ feet deep. In dividing the cost of the work, the city is being charged only with 35 per cent of the cost of replacing two tracks, with the same percentage of the cost of bridges figured on a two-track basis, and for its percentage of the cost of only 1 foot of excavation incident to putting in the rock ballast. Because Cleveland can obtain cinders free of charge, and because cinders composed the original ballast, in the new work the city is bearing only the cost of freight and labor for 1 foot of the new rock ballast. Cleveland's portion of the cost of this work, in fact, will amount to 25 per cent of the total cost.

In the Missouri Public Service Commission's order pertaining to elimination of the Oak Hill grade crossing at Kingshighway Boulevard, St. Louis was directed to pay one-third of all costs, notwithstanding complete rejection of the city's plan for track depression and an order for a railroad viaduct and depression of the boulevard.

Cleveland Pays One-Fourth

The work referred to comprises the depression of 14,000 feet of the tracks of the Nickel Plate Railroad and the construction of fourteen highway bridges and five foot-bridges. Three of the crossings carry street railway tracks. When this work was planned, in 1913, the cost was estimated at \$2,900,000, and the city's share was fixed

at \$725,000, or one-fourth. When the work was begun in 1916, the railroad company was without available funds for immediate use, and in order to expedite operations the city advanced its full share. The work is now well toward completion, and the railroad has expended its full share of the original estimate. Higher prices of material and labor have advanced the cost of the project far above the original estimate. Hence the city soon will be the railroad's debtor on the job, reversing the original relation between the city and the railroad company.

The Ohio law is of interest, further, in that it gives to the city council the right to stipulate all details pertaining to a grade separation in ordinance form, including the estimated cost. The law also provides against such delay as has been experienced in St. Louis.

The city council is empowered to require the railroad company to cooperate with the city's engineers in the preparation of plans for either track depression or track elevation, and such plans and specifications are to be prepared within ninety days after the council has ordered the preparation of the plans. If an agreement has not been arrived at for grade separation, eighty parties may appeal to the court of common pleas, petitioning for abolition of a grade crossing and accompanying such petitions with plans for the abolition.

The law directs that hearings upon such petitions are to be advanced upon the docket on the motion of either party. The court has the right to pass on plans submitted, and "shall order changes to be made in accordance with the most reasonable and practicable plans presented to the court."

Court Action Not Needed

In case of refusal to comply with such orders, the court may force compliance by mandamus, mandatory injunction, or as for contempt of court. Incidentally, in the grade separation program of Cleveland it has never yet been necessary to make use of this legal right to appeal to a court.

In connection with the division of cost for grade separation work, provision is made to include the cost of replacing the street railway tracks as a part of the cost

to be shared between the city and the railroad company. Ordinarily such cost is to be defrayed by the street railway company. In Cleveland, however, the street railway company pays only the cost of constructing temporary tracks, for use while operations are in progress.

All municipally owned utilities, such as sewers and water pipes, are accommodated to the changed grades as part of the grade separation, and the cost is so figured. All other public utilities, privately owned, must pay for changing their own facilities. In all grade separation work done by the railroads there is close supervision by the city.

38 Crossings Eliminated

A total of 38 grade crossings have been eliminated in Cleveland, 14 are to be eliminated by the Nickel Plate depression which has been referred to, and 10 more are to be eliminated by track elevation projects on which work is soon to be begun, making a total of 62 grade separations effected or to be effected through cooperation between the city and railroad companies. There are now in place 14 highway viaducts where railroad tracks have been depressed.

One of the large grade separation projects in Cleveland is that of the Pennsylvania Railroad—a track elevation through industrial districts for more than 5 miles. This includes 19 crossings, at 12 of which the grades have been separated. The remaining 7 grade crossings are to be eliminated by work already planned.

Grade separation work already completed in Cleveland has cost \$8,050,000, construction has cost \$6,482,000, and the bill for land and damages amounts to \$1,568,000.

Approximately 60 per cent of all grade crossings in Cleveland have been eliminated. The city's share of the cost of grade elimination work is met by bond issues voted by the City Council, there being no necessity of going before the people for authorization within a limitation. The Cleveland City Council may authorize bonds to the extent of $2\frac{1}{2}$ per cent of the assessed valuation, and $2\frac{1}{2}$ per cent more than that amount may be voted by the people.

Securing Stable Foundations for Municipal Structures

The Responsibility of the Municipal Officer for Underground Exploration in Advance of Construction

By James F. Sanborn

Consulting Engineer, New York City

MONEY-SAVING, from any point of view, is properly based upon a correct understanding of all the conditions surrounding a project. As most projects for municipal betterments involve construction, and as all structures depend for their permanence upon secure foundations, it is evidently well to know with certainty in advance all that can be learned about the condition of the soil and rock underlying the site of any contemplated project. Indeed, it becomes the duty of officers responsible for projects to understand the nature of the problems, and to be sure of the terms to which they are committed.

Since conditions beneath the surface are not readily seen, it is evident that some special method must be used to get the necessary information. A proper examination of a site usually involves explorations by test pits and borings, and a careful examination of the samples taken by a competent and experienced engineer or geologist.

Not all municipal engineers have the necessary experience to recognize the value of such careful preliminary work. It is unfortunately the fact that important structures have in many cases been started without proper exploration of the underground conditions, with the result that the final cost far exceeded the preliminary estimate, which was based on a guess that the conditions would be favorable.

In New York City to-day there is a great public building, recently started, whose foundations must be in part redesigned at a greatly increased cost over the original estimate, because of the fact that the ground water is now about 20 feet higher than it was predicted when the first studies were made some years ago. A few hundred dollars spent for borings would have easily established the existing conditions in this case.

Objects of Boring Investigations

The objects or purposes of boring in-

vestigations, it may be explained, are chiefly (1) to determine the character and thickness of the soil above bedrock; (2) by penetrating the bedrock by appropriate drills to determine the character of the rock or its attitude; (3) by watching the behavior of the drill and by careful examination of the samples recovered by boring, to be able to determine the physical condition of the rock, and in some cases its water-bearing capacity or the value of the material for particular purposes, when these are important.

Some of these purposes are simple in many cases, and require but little special study, but in other cases the point at issue often has an important bearing upon the success of the entire enterprise.

Mistakes in Determining Depths to Rock

Such a simple matter as determining the depth to rock has been attended by many mistakes, due usually to inadequate drilling equipment, and has often resulted in great cost to the municipality for extra construction, or for lawsuits.

By making borings at proper places, it is possible to locate and map contacts of one formation with another, and thus to avoid material deficient in certain desirable qualities. Quicksands in water-bearing bottoms or decayed rock are materials in this class which may give trouble if met unexpectedly through lack of preliminary exploration. Almost anyone with much experience in such matters will readily recall cases of inadequate preliminary preparation on work with which he has been connected.

Type of Work Controls Equipment Needed

A simple list of the kind of work for which preliminary borings are commonly required includes bridge piers, building foundations, borrow-pits, dredging, docks, pile work, sewers, quarry sites, dam foundations, aqueducts, subways and tunnels, min-

eral deposits, and many other undertakings.

How to go about making the explorations, and what type of equipment to use, depends upon the kind of work one has in hand and the material to be penetrated. A correct preliminary determination of the general nature of the ground, and a proper selection of the equipment, are matters of the first importance, and will save a great deal of time and expense. Much money is often wasted on ineffectual attempts to drill with too light a rig, especially in penetrating earth containing gravel or boulders.

The following methods are employed for underground explorations in earth: the

tire work. One would naturally recommend spending much more care and money in gathering information for a large and stable structure than for a light and more temporary one, but in either case experience shows that the pains spent on a preliminary investigation are generally not wasted.

A knowledge of the material underground which may be encountered upon excavating the earth or rock may be useful for determining (1) the amount of such excavation, for purposes of design or estimate; (2) the method necessary to employ, and cost of excavation (whether timber will be required, etc.); (3) the water-bearing char-



CHURN DRILLING RIG BUILT AND OPERATED BY EMPLOYEES OF THE BOARD OF WATER SUPPLY, CITY OF NEW YORK, FOR EXPLORATIONS ON THE CATSKILL AQUEDUCT

The rig can sink a casing 200 feet in rocky, glacial drift, and is operated with a diamond drilling machine for taking rock cores

sounding rod, the wash boring rig, the churn drill; and for penetrating rock, the shot drill, and the diamond drill. These methods are often used in combination: for example, casing may be carried to rock, using a drive weight and wash pipe, driving through and blasting aside with dynamite any gravel or small boulders encountered, and on reaching rock, a diamond drilling machine may be used to take a core of the ledge rock for determining its character.

In deciding what method to use for any particular job, it is important to consider the relative importance or value of the information sought with reference to the en-

acter of the material, amount and cost of pumping, and the difficulties in the execution of the work, and possible danger to the completed structure from this source of trouble; (4) the bearing value of the material under loads may also be determined upon inspection and test of the samples taken. Upon the records of observed facts secured both during the actual drilling operations and by tests of the samples, are based the important conclusions which may govern the selection of the design, which determines the cost of the work. It is found necessary, then, to have at all times during the progress of the boring work a competent inspector in close touch with all that

goes on. In case of very important work, the inspector should have no other duty but to make a careful record of all the observed facts, to collect, label, and preserve the samples taken and to be available later to give information regarding these matters to the people responsible for the design of the works.

This matter of making a good and reliable record is important, since the purpose of making the borings evidently contemplates a true statement of the facts. Strange to say, it happens too often that no adequate written record or report is ever made, and the samples are often thrown away at once. The information should all be kept, certainly during the life of the job, and until all possible danger of lawsuit is past.

The city of New York, through its Society of Municipal Engineers, supported by the Board of Estimate and Apportionment, has made a collection of boring records and samples of earth and rock, with other ex-

hibit material illustrating the geology and underground structure and their relation to the topographic form of the city. The exhibit is housed on the 34th floor of the Municipal Building, and is intended primarily for the use of the various city departments, whenever studies are being made for any project or structure that involves subsurface construction. The data from some 1,600 borings have been preserved, and a record entered upon a standard form giving the available information considered reliable in each case. It is expected that much duplication of effort and unnecessary expenditure of funds will be avoided by the use of the data.

Use of the collection is, however, by no means restricted to the city departments, but is open to anyone searching for information in regard to underground conditions or drilling methods. Such a collection gathered in other cities would prove of inestimable value as it grows and borings become more abundant.

Man-Made Diseases

Many of the diseases that afflict man may almost be said to be made by him, for they are spread almost entirely by his disregard of the simplest rules of sanitary living.

Typhoid fever, for instance, is spread by the contamination of water, milk, and food by human filth which has been run into rivers or wells or left exposed for flies to carry to the kitchen or dining-room, or which, even more disgustingly, is carried to food directly from soiled hands. Hookworm disease and other intestinal diseases are spread, to some extent at least, by the states which allow road-building gangs to work under conditions which often compel them to scatter pollution to be carried by flies to kitchens or to be ground into the soil to be picked up by the bare feet of children. Practically all hookworm disease is due to soil pollution.

Malaria, too, is often spread by the ignorance and carelessness with which mosquito-breeding places are created or disregarded. Borrow-pits, dug to obtain stone for road work and other needs and left to fill with water, furnish homes for thousands of wigglers; culverts improperly placed produce pools that are equally prolific; ditches that are clogged and never cleared out are popular and populous; railroad and other

embankments that stop or check the flow of water, create conditions that are ideal—from the point of view of the prolific mosquito.

Dr. T. F. Abercrombie, Health Officer of Georgia, has suggested that the convict and other gangs who work along the roads be required to fill up borrow-pits, place culverts properly, clean ditches, and attend to other small but important details that any man can do and that will deprive the mosquito of many of her breeding-places. To accomplish this along the roads is more important than it may seem, for a mosquito hatched at the roadside does not have to wander in search of food; all she has to do is to wait for food to come to her. Moreover, if she is of the anopheline species, which spreads malaria, she has excellent chances both to acquire the malaria germs and to pass them along. Until she bites someone who has the disease, her bite, though no more pleasant than that of any other mosquito, is not any more dangerous, but a single malaria patient, driving along a ditch-bordered, mosquito-infested road, may provide hundreds of the insects with germs which they may pass on to every traveller along that road.

—U. S. Public Health Service.

Providing a City with 120,000,000 Gallons of Water a Day

Recent Improvements to the Cincinnati Municipal Water-Works Power Plants

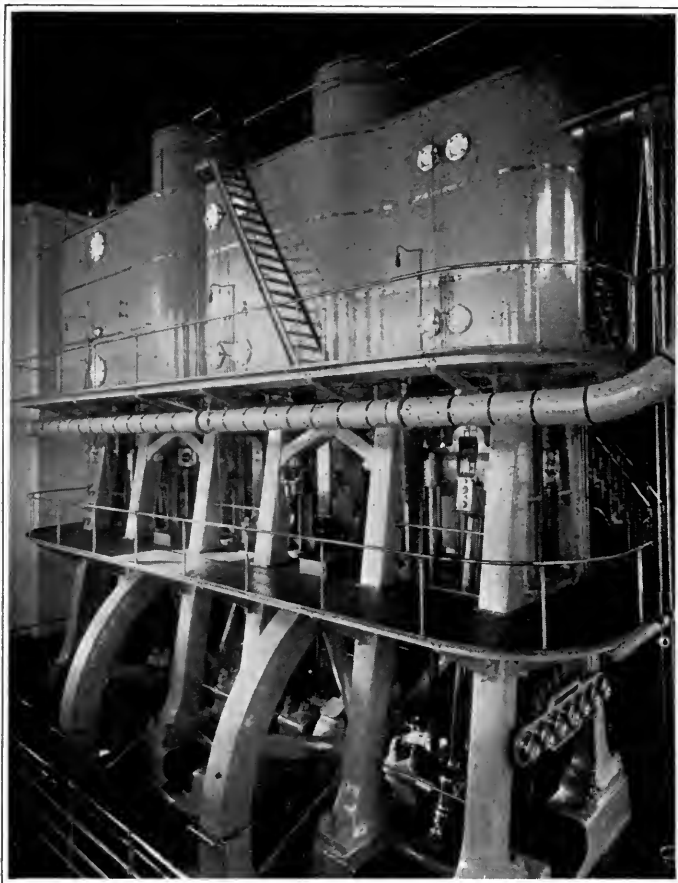
By Felix J. Koch

CINCINNATI is now completing varied improvements to the municipal water-works which will insure the city a supply of 120,000,000 gallons of water daily whenever so large a quantity may be needed. When one recalls that, except in midsummer, the Ohio is one of the most turbid and polluted rivers, and also that residential Cincinnati consists almost wholly of high hills and covers a vast area, the task involved in all of this becomes still more notable.

In order to insure an ample supply in seasons of drought, water is not drawn from the Ohio side, but from the Kentucky side of the stream, where the channel lies. Besides, water taken from the channel is less contaminated. The intake consists of an attractive structure rising from the stream, some yards from the Kentucky shore. The water enters the intake at low velocity, so that the current will not carry too much silt with it past the heavy screens which serve to keep-out all débris.

To convey water to the filtration plant, there is a brick tunnel, 7 feet in diameter, 1,500 feet in length, built across the river bottom, connecting with a vertical shaft at the center of the main pump-pit. Heavy gates make it possible to close this tunnel to make repairs.

Traversing the tunnel, the water enters an initial "shaft," 145 feet high, which runs up through the center of the monster pit to



**VERTICAL TRIPLE EXPANSION ENGINE WITH PUMP OF
17,000,000 GALLONS DAILY CAPACITY**

the floor of the actual pump-house. The upper portion of the shaft forms the pivot for a 30-ton electric traveling steel crane. The outer rail for the crane is set on the walls of the circular superstructure of the building.

At the bottom of the pump-pit, 16 feet below the pool-stage of the river, are located the major engines of the water-works. The machinery cost \$1,000,000 erected. The space surrounding the shaft, where it emerges through the pit-floor, is given to

four vertical triple-expansion engines. The suction pipe of each engine is connected with the vertical shaft, and heavy gate valves are provided to meet all contingencies. Each of these engines has a capacity of 30,000,000 gallons of water a day. Usually only two are used at one time; sometimes a third is required; the fourth is held in reserve.

The engines represent the highest type of triple expansion pumping machinery, and are 105 feet in height. A feature believed to be unique among water-works pumping-plants consists in the location of the crank-shaft and the major bearings and fly-wheels on the top of the pump-valve chambers, 30 feet above the base of the pit. The steam cylinders are located at the elevation of the main floor of the pump-house, and the engines, in consequence, have been fitted with extra-long piston rods. These engines have an 8-foot stroke and a speed of 16 revolutions per minute. The boiler-room contains a battery of Sterling boilers of 420 h.p. each, which are equipped with super-heaters. Contracts have been let for a duplicate battery. Riley underfed stokers with forced draft are used.

That the boiler-room may be kept clean and inviting and in harmony with the rest of the monster plant, and this with a minimum of employees, a tunnel 9 feet wide and 12 feet deep has been built across the length of the room. Small cars traverse this tunnel for the ashes, which are dumped into an elevator, which raises the ashes and dumps them into the ash-bin. A portion of the ashes is used to provide the road-bed for the service-railway that traverses every part of the water-works grounds. Coal is handled in a weigh lorrie which traverses the length of the boiler-room.

The water, after entering through the tunnel, is pumped to the settling reservoirs. From these it is drawn through "floating tubes" to the head-house of the filtration plant. At this stage the volume and head of the water furnish power which is used to drive three horizontal water-wheels of 80-h.p. capacity. These wheels are direct-

connected with three 50-kilowatt, 220-volt generators. Each wheel requires for its operation 23,000 gallons of water a day. Two of the water-wheels are in constant operation; the third is held in reserve. The current generated is used to light the filtration buildings, the river pumping-station, and the roads throughout the grounds. The surplus is used for operating the gate-valves in the filter-house and other machinery.

After pumping, the water is treated chemically. Daily analyses are made of the raw and treated water to regulate the application of the lime and sulphate of iron. After the chemicals are added to the water, it goes to three coagulating-basins and thence to the filter building.

The Main City Pumping Station

After treatment and filtration the water flows through a tunnel 7 feet in diameter and 22,600 feet in length, cut through solid bed-rock beneath the Little Miami River, and through this the filtered water runs by gravity to a shaft at the main city pumping station.

At this station three vertical expansion engines, having a capacity of 25,000,000 gallons a day, supply water to the business section of the city. Other pumps take care of what is called "surplus pumping." Three engines of 12,000,000 capacity and one of 17,000,000 gallons pump directly into the mains leading to the hills, at a pressure ranging from 190 to 210 pounds.

While it is difficult to determine the actual values, owing to the depreciation through use and the rise in price of material, it is estimated that the Cincinnati water-works equipment represents an investment of about \$20,000,000. The annual cost for the water-supply service is \$1,500,000. To decrease the tendency to waste water, a meter system is being installed throughout the city to supplant the flat rate based on the number of hydrants or taps used. The average Cincinnati householder pays 12 cents per 100 cubic feet, 750 gallons of water.

The city is now practically 100 per cent metered.

No city is really free and civilized so long as a disease transmitted by filth—typhoid fever—forces hundreds of its citizens into beds of sickness.

The Economy of Municipal Testing Laboratories

By C. M. Fassett

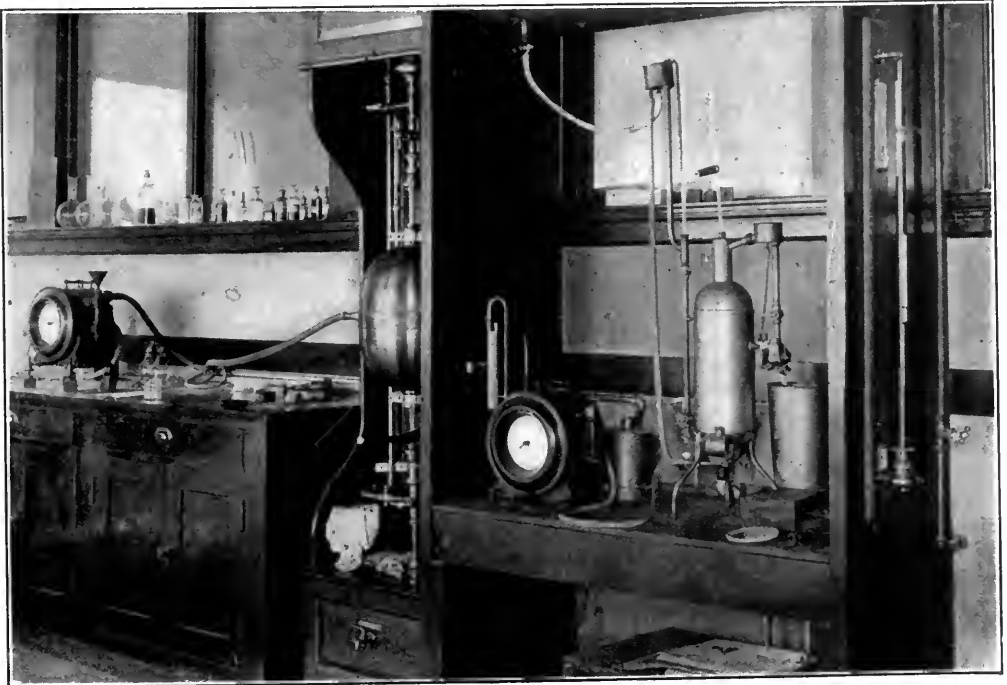
ONE of the most frequently neglected sources of municipal profit and economy is the city chemist and his testing laboratory. To-day no large industrial plant is without a chemist, and but few industries can make as good use of a chemist as can the modern city government. There is scarcely a municipal undertaking which his aid does not make better, more efficient and more satisfactory, and perhaps no other investment which a city can make will yield a more immediate and profitable return than the purchase of the necessary laboratory equipment and a chemist's services.

The testing laboratory in Spokane, Wash., costs about \$4,000 a year. One of its first accomplishments was the improvement of the gas supply. Its heating quality was raised not less than 20 per cent, thus increasing its value to Spokane consumers by at least \$50,000 a year. At one time Spokane bought supplies of all sorts without

much knowledge of their quality; now everything is tested before purchase. Every lot of asphalt and cement which goes into the pavements, every barrel of paint or lubricant, every shipment of paving brick, is subjected to such analyses and tests as will determine their real value.

Spokane used to buy fire hose on the suavity of the salesman; now she knows the strength and elasticity of the rubber, the character of the cotton and the tensile strength of the threads in the jacket. A saving of 30 or 40 cents per foot has not been uncommon, as comparative price does not always determine comparative quality.

But the most valuable work of the city chemist cannot be measured by its money cost. His service to the engineering and purchasing departments is worth not less than \$100,000 per year to Spokane, but his most important work is that done for the health department in the testing of milk and



CALORIMETER FOR TESTING ILLUMINATING GAS IN SPOKANE, WASH., MUNICIPAL TESTING LABORATORY

other foods, the analysis of water and sewage, the microscopic examination of cultures and smears for pathological evidence, and in general bacteriological investigations. His services are of value also to the police department, where a court conviction frequently hangs upon the percentage of alcohol in a beverage or the presence or absence of poison in a suspected substance.

Keeping Goods Up to Standard

Standard goods are not always up to standard. A car of cement purchased for the city engineer which tested weak was rejected on the chemist's report. Two days later another car of identical quality was offered, and it was discovered that the first car had been unloaded into another and delivered to Spokane the second time under a new number. The weak cement did not find a resting place in any of Spokane's bridges, and the contractor who tried to "put it over" was carefully watched thereafter. Of course the weak cement was not thrown away; it went to some city which had no testing laboratory.

The word "paint" is probably the most elastic term known to the world of trade. To the lay mind it conveys the impression of a mixture of white lead and linseed oil, but it frequently contains neither, and, indeed, it may answer some purpose without these constituents. But the label on the can shyly avoids mentioning the materials to be found within it, and if a city buys on the label, the quality may not show itself until the paint has been exposed to the weather for a few months. The loss covers not only the worthless material, but also the good labor used in its application. A little investigation in the testing laboratory may easily save a large amount of labor and of money on the job.

In building concrete structures or laying pavements, it is necessary not only that the materials which go into the mixture shall be of proper quality, but also that the mineral aggregate shall be so sized that the voids will be as well filled as possible. In the Spokane testing laboratory asphalts and cements are carefully analyzed, as well as subjected to physical tests for penetration, melting point, tensile strength, time required for setting, etc.; sands are examined under the microscope for sharpness and soil, and

broken stone put through sizing tests. Materials of construction must actually be what they pretend to be, before they are allowed to go into the city's structures.

It is almost impossible to buy lubricants intelligently without the means of testing their quality. Samples are submitted with all bids, and supplies are bought in sufficient quantity to justify keen competition. Of course there are standard brands which can be adhered to with good assurance of quality, but as a rule the purchaser pays for the brand something above the intrinsic value of the product. A collection of pretty sample bottles does not mean an economical purchase; only by scientific test can any real discrimination be effected. The testing laboratory is the answer.

Nearly all states have stringent laws regulating the quality of milk offered for sale. But the visits of state inspectors are usually infrequent, and state laboratories are seldom accessible for immediate use in the examination of foods which deteriorate rapidly. No city can be sure of its supply without facilities for the chemical and bacteriological examination of milk.

The Cost

The installation of a municipal testing laboratory is not particularly difficult nor expensive. A couple of well-lighted rooms are needed, with available connections to gas, electric, sewer, and hot and cold water service. Steam and compressed air are desirable but not absolutely necessary. Flues for carrying off offensive fumes must be arranged, if not already available in the rooms. Apparatus is expensive, but after a start is made it can be added from time to time as needed. Two thousand dollars will buy sufficient for a good beginning.

Compared with the advantages derived from a testing laboratory, even those benefits which may be estimated in terms of dollars, the cost of installation and maintenance is trivial. There has not been a year since the Spokane laboratory was established that it has not been worth \$100,000 to the city, partly as a direct saving to the taxpayers, and partly as procuring better service from the public utilities and municipal contractors. The value of its service in health, food and police investigations cannot be estimated in money.

The Case of Pittsburg, Calif.

A Lesson for Serious Consideration by All Municipal Officials

PITTSBURG, CALIF., is a busy industrial center about $1\frac{1}{2}$ miles inland from Suisun Bay. Here there is a branch of the United States Steel Corporation, large plants belonging to the Great Western Electro Chemical Company, which supplies liquid chlorine as well as other products and to the Parafine Paint Products Company and other establishments employing many men.

The water-supply for the city is pumped from the San Joaquin River and is coagulated and passed through pressure filters, installed primarily to remove turbidity. At every high tide the water backing up from the bay into the river carries with it a considerable quantity of sewage and industrial wastes. While filtration clarified this contaminated water-supply, Wallace & Tiernan chlorinating apparatus was installed three or four years ago to sterilize the clarified water and thus furnish the consumers with a supply which was safe as well as clear. From the date of that installation until June, 1920, there was no epidemic of water-borne disease in the city.

On June 1 a tank of gas with an old-type tank valve was delivered to the operator of the chlorinating apparatus. The tank could not be connected with the apparatus on account of the tank valve, so the operator, instead of obtaining a new tank of gas immediately, attempted unsuccessfully to make an adapter by which a connection could be patched up. While he was trying to do this the water-supply was not chlorinated for about eight hours, although there was an emergency equipment for sterilizing the water with chloride of lime, which was not put into service.

Soon afterward, 8 cases of well-defined

typhoid fever developed and between 150 and 200 cases of diarrhoea, which have been attributed by the State Board of Health to the interruption of the chlorination of the supply. That Board draws these deductions from this epidemic:

"The people of a city using a water-supply that requires purification are entitled to more consideration than this [interruption of chlorination and failure to notify either the local or state health department]. The persons immediately responsible for the operation of water purification works should stop to ponder over the fact that they are depended upon to protect the lives and health of their consumers and that if they fail it is as though they took deliberate steps to bring physical injury on their consumers. Persons receiving such injury have a just claim for damages against the water department. Some water-supplies are continuously dangerous, others intermittently dangerous. In either case, unfailing purification at all times is necessary to relieve the persons supplying the water of liability."

The State Board of Health regards the facts from the view-point of public health. Seen from the view-point of a water-works official, the facts teach two distinct lessons clearly:

First, the operator of a chlorinating apparatus must be thoroughly taught the importance of uninterrupted chlorination, so that at the first indication of the possibility of an interruption he will notify the manager of the plant and give the latter an opportunity to get all hands on the job of preventing such a serious condition.

Second, duplicate chlorinating apparatus and full tanks of gas, all in good working order, should be kept on hand where it is known that the raw water is contaminated with sewage. The cost is far less than that of defending damage suits brought because of a contaminated water-supply which resulted in an epidemic.

Formerly one of the most typhoid-afflicted cities, Toledo, Ohio, has become one of the least-afflicted cities from this disease. In 1906, 72 persons died here from typhoid fever. In 1919, ten deaths occurred. This is a death rate of less than four per 100,000 population. That is what can be accomplished by public health administration and a well-administered water purification works.

Establishing Rates for Service Rendered by Public Utilities by Contract—Part I

A Discussion of the Legal Status of Contracts Between Utilities and Cities, of Municipal Ordinances and State Public Utility Commission Decisions

By Walter A. Shaw

Consulting Engineer, Chicago, Ill.

BY an act of the Illinois Legislature, approved June 30, 1913, and in force January 1, 1914, there was established a rule by which it can be determined whether or not "all rates or other charges made, demanded or received by any public utility, or by any two or more public utilities, for any product or commodity furnished or to be furnished or for any service rendered or to be rendered" are just and reasonable. Section 32 of the act provides as follows:

"Every unjust or unreasonable charge made, demanded or received for such product or commodity or service is hereby prohibited and declared unlawful."

Section 41 of the act also provides as follows:

"Whenever the Commission, after a hearing had upon its own motion or upon complaint, shall find that the rates or other charges, or classifications, or any of them, demanded, observed, charged or collected by any public utility for any service or product or commodity, or in connection therewith, including the rates or fares for excursion or commutation tickets, or that the rules, regulations, contracts or practices, or any of them, affecting such rates or other charges, or classifications, or any of them, are unjust, unreasonable, discriminatory or preferential, or in any wise in violation of any provision of law, or that such rates or other charges or classifications are *insufficient*, the Commission shall determine the just, reasonable or sufficient rates or other charges, classifications, rules, regulations, contracts or practices to be thereafter observed and in force, and shall fix the same by order as hereinafter provided."

Attention is called to the fact that if the Commission after a hearing, held upon its own motion or upon complaint, shall find the rates or other charges insufficient, the Commission shall determine the just, reasonable or sufficient rates. From such action there is no escape unless the several individual Commissioners making up the Commission violate their oath of office.

As to what constitutes a just, reasonable or sufficient rate, the Supreme Court of Illinois in the case of The State Public Utilities Commission ex rel. The City of Springfield vs. The Springfield Gas and Electric Company (291 Ill., 219) said:

"The basis of all calculations as to the reasonableness of rates to be charged by a corporation maintaining a public utility under legislative sanction must be the fair value of the property being used by it for the convenience of the public, and in order to ascertain that value the original cost of construction, the amount expended in permanent improvements, the present cost of construction, the probable earning capacity of the property under the particular rates prescribed by statute, and the sum required to meet operating expenses, are all matters for consideration and are to be given such weight as may be just and right in each case."

The rule laid down by the Illinois Supreme Court to determine the reasonableness of rates to be charged by a public utility is in full accord with the rule laid down by the United States Court and the Supreme Courts of other states.

In the Springfield Gas Case above, the Illinois Supreme Court, in concluding, said:

"After all, the questions presented in this case are largely questions of business judgment, and no rule can be laid down which can be applied mathematically to every situation. Each case must rest largely upon its own facts. We are aware of the grave character of the questions with which we have had to deal and of the great injury, not only to private interests but to the public at large, that may result from error. The same may be said of any legislative policy in matters of moment. We have dealt with the legal principles underlying this case, but the ultimate question is a question of business, and results cannot be predicted. In such a case the commissioners ought to move with caution. An unwise administration of regulatory laws will drive capital from the field and bring on public calamity by causing the utilities to cease to function. It is equally important to the public and the utilities that the rates established be just and reasonable."

The Cities' Attitude Toward Contracts

Let us see how some of the cities in the state of Illinois regarded so-called contracts and constitutional rights, long before any public utilities commission existed.

On November 9, 1882, the City Council of Danville passed an ordinance granting the Danville Water Company the right of constructing and maintaining water-works, and of using the streets of the city for that purpose for the term of thirty years. By the same ordinance the city agreed to pay the water company as hydrant rental for 100 fire hydrants for the term of thirty years, at the rate of \$75 each per year. It was further provided that hydrants in excess of 100 should be at the rate of \$62.50 each per year for the next 40 hydrants; and for all in excess of 140 the rate should be \$50 each per year.

On January 17, 1895, the City Council of Danville passed an ordinance reciting that the rate theretofore charged as hydrant rental were excessive, and that from and after May 1, 1895, the rate for the first 140 hydrants should be \$50 each, and proportionately lower rates should be charged for additional hydrants.

The city contended that the rates fixed in the last mentioned ordinance were just and reasonable, and that its indebtedness to the water company should be computed upon the bases of the rates prescribed.

The water company contended that the ordinance of November 9, 1882, fixing the higher rate for a period of thirty years, constituted a valid contract between it and the city; that the subsequent ordinance of January 17, 1895, which provided for a substantial reduction in water rates, was unconstitutional and void.

The water company challenged the power of the City Council of Danville to fix rates other than those fixed in the ordinance of November 9, 1882, and invoked the aid of the courts. The Illinois Supreme Court in deciding this case (*City of Danville vs. The Danville Water Company*, 178 Ill., 299) on February 17, 1899, said:

"Said Section 1* authorizes the City Council to empower a private corporation to construct and maintain water-works at such rates as may be fixed by ordinance. The meaning of this language is, not that the water-works are to be maintained at such established rate as may be

fixed by one ordinance for a period of not exceeding thirty years.

"The evident meaning of Section 1 is that there was to be reserved to the City Council the power to fix the rates by ordinance at such figures as should be fair and reasonable. If the rates were to be fixed by ordinance, they could only be fixed by such ordinance as was legal and whose passage was within the power of the Council. *A legislative body cannot part with its powers by any proceeding, so as not to be able to continue the exercise of such powers. It has no authority even by contract to control and embarrass its legislative powers and duties.* (Greenhood on Public Policy, p. 317; Cooley's Const. Lim., p. 206; 15 Am. & Eng. Ency. of Law, p. 1045; 1 Dillon on Mun. Corp., sec 443.) What might be proper for a city this year might not be proper the next year. It is impossible to determine with absolute or even tolerable certainty what changes a few years might work in the character and reasonableness of rates to be charged for water-supply. No contract is reasonable by which the governing authority abdicates any of its legislative powers and precludes itself from meeting, in a proper way, emergencies or occasions that may arise. 'These powers are conferred in order to be exercised again and again, as may be found needful or politic, and those who hold them in trust to-day are vested with no discretion to circumscribe their limits or diminish their efficiency, but must transmit them unimpaired to their successors. This is one of the fundamental maxims of governments; and it is impossible that free government with restrictions for the protection of individual or municipal rights could long exist without its recognition.' (*Gale v. Kalamazoo*, 23 Mich., 354; *Millikin v. County of Edgar*, 142 Ill., 528.)"

This same case was twice again appealed to the Illinois Supreme Court on practically the same set of facts, and the opinion of the Court was adhered to in the above case. (*City of Danville v. Danville Water Company*, 180 Ill., 235; *Danville Water Company v. City of Danville*, 186 Ill., 326.)

An appeal was finally taken by the Danville Water Company to the Supreme Court of the United States, where the decision of the Illinois Supreme Court was affirmed (*Danville Water Company v. City of Danville*, 180 U. S., 619.)

About this time two other cases in Illinois received the attention of both the Supreme Court of Illinois and the United States Court: *Rogers Park Water Company v. John B. Fergus* (decided February 17, 1899, the same day as the original Danville case), 178 Ill., 571, and the *Freeport Water Company v. City of Freeport* (decided June 21, 1900), 186 Ill., 179. In these two cases the questions presented and decided were substantially the same as those passed upon in

* City and Village Act of Illinois, 1872, Article 10, Section 1.

the Danville case. The Illinois Supreme Court adhered to its decisions in the Danville water cases. These cases were then appealed to the Supreme Court of the United States, where the judgment of the State Court, in each case, was affirmed. (*Rogers Park Water Company v. Fergus*, 180 U. S., 624, and *Freeport Water Company v. Freeport City*, 180 U. S., 587.)

The writer has personal knowledge of the case of the Rogers Park Water Company through residence in Rogers Park, Ill., from 1891 to date. In 1891 it was a municipality with its own local government. About 1888 it granted to the Rogers Park Water Company a so-called contract franchise for a term of thirty years, in which the company was permitted to meter all consumers and to charge at the rate of 40 cents per 1,000 gallons for water furnished for domestic purposes.

After the water-works was installed and other improvements were put in, such as sewers, pavements, etc., the territory settled quite rapidly. Consequently the water company prospered to a fair degree, and about 1896 or 1897 it charged domestic consumers about 25 or 30 cents for 1,000 gallons, an amount substantially less than the ordinance rates. About this time one John B. Fergus, a resident of Rogers Park, then a part of Chicago, by annexation in 1893, formed an association composed of a large number of consumers of the company for the purpose of contesting the rates charged by the Rogers Park Water Company on the ground that they were excessive and unreasonable. Through counsel employed, they induced the City Council of Chicago to pass an ordinance fixing the rates to be charged by the Rogers Park Water Company the same as those charged by the city of Chicago, very much less than those of the company. This action was challenged by the water company, and relief was sought in the courts, with results heretofore set forth, namely, that the city had no power to make a contract to fix unalterable rates for a term of years, but could enter into an agreement with the water company whereby "the supply could be made for the entire term, but the price is to be determined from time to time, and the rates to be settled by the rules of common law."

When the Rogers Park case was finally settled by the United States Court, Mr. Fergus was heralded as a great public benefac-

tor. The right was established on part of the public that, franchise ordinances to the contrary notwithstanding, a state agency had the right to fix just and reasonable rates from time to time as the case may be.

Some Recent Decisions

Attention is now called to more recent decisions of the courts, some of which were based upon litigation growing out of orders entered by the Public Utilities Commission of Illinois. *State Public Utilities Commission ex rel. Harley B. Mitchell, et al., v. Chicago and West Towns Railway Company, et al.*, 275 Ill., 555. In this case the Chicago and West Towns Railway Company and others appealed from an order of the Public Utilities Commission dated October 15, 1914, directing said companies to return to the rates and fares in effect July 1, 1913, which were the rates permitted to be charged by authority of the municipalities served until such time as the Commission could determine and fix the just and reasonable rates and fares. The Commission entered this order because it was shown that the railway companies had increased their rates on December 31, 1913, which was contrary to Section 33 of the Public Utilities Commission Act. The Illinois Supreme Court held that this provision of the act was void, and that the law did not become operative until January 1, 1914; that until said law went into effect there was nothing to prevent the appellants from increasing their rates.

It was further contended by the company in this case that the provisions of the Public Utilities Commission Act under which the Commission was authorized to regulate the rates of a street railroad was in violation of Section 4 of Article II of the state constitution. In disposing of this contention, the Court said:

"The Public Utilities Act does not violate Section 4 of Article II of our constitution. That provision is simply a limitation of the general powers of the Legislature, and in one particular only. It provides, in substance, that the Legislature may not grant the right to construct and operate a street railroad within a municipality without requiring the consent of the local authorities having control of the streets or highways proposed to be occupied. That section of the constitution does not, by implication or otherwise, attempt to divest the state of its paramount authority and control of streets and highways. (*Chicago and Southern Traction Co. v. Illinois Central Railroad Co.*,

246 Ill., 146.) It is equally clear that that section of the constitution does not deprive the Legislature of its power to fix rates for such companies. Section 34 of Article 4 of the constitution has no bearing whatever on the question of the authority or power of the state to fix rates for a street railway. That section specifically provides that nothing therein contained shall be construed to repeal, amend or affect Section 4 of Article 11 of the constitution."

In the case of the City of Chicago, et al., v. Wm. L. O'Connell, et al., 278 Ill., 591, subsequently sustained by the United States Court, the Illinois Supreme Court said:

"It is true that a municipality cannot contract

away the right to exercise the police power to secure and protect the morals, safety, health, order, comfort or welfare of the public, nor limit or restrain by any agreement the full exercise of that power. We have accordingly held that a city cannot contract away its right, under the police power, to fix reasonable rates to be charged by a public utility furnishing water to the city and its inhabitants. (Rogers Park Water Co. v. Fergus, 178 Ill., 571; City of Danville v. Danville Water Co., 178 id., 299; Freeport Water Co. v. City of Freeport, 186 id., 179.)

ACKNOWLEDGMENT.—From a paper read before the Iowa and Illinois Sections of the American Water Works Association.

(To be concluded in the July issue)

Don't Burn Up Your Public Buildings

Invaluable Municipal Records Are Lost Each Year Through Inadequate Protection

ON January 14, 1921, the City Hall at Columbus, Ohio, was reduced to ashes and debris, and a widespread conflagration was narrowly averted, as the fire department had difficulty in saving neighboring buildings. In fire-resisting construction public buildings of all sorts should be examples for citizens to follow. The Columbus City Hall, manifestly, was not such an example.

It is sincerely to be hoped that the city officials in replacing burnt buildings or putting up new ones will take care to erect structures which will resist outside fire ravages and which, in themselves, will be non-inflammable. Public records upon which many million dollars of real estate and other transactions depend must be protected from fire.

The reports of fires in public buildings in 1920 show that many public records were threatened in this manner.

January 6, 1920. Sturgeon Lake, Minn. Village hall. One 2-story building damaged. Walls, wood. Floors, wood. Roofs, shingle. Cause, defective chimney. Fire started in attic. Discovered by smoke from bell tower about 11 A. M. Alarm given by people. Duration, 2 hours. Stopped when building was completely burned. Firemen handicapped by frozen chemical. Private fire apparatus, bucket brigade. Persons in building, none. Killed, none. Injured, none. Means of escape, wide stairway. Property loss, \$500.

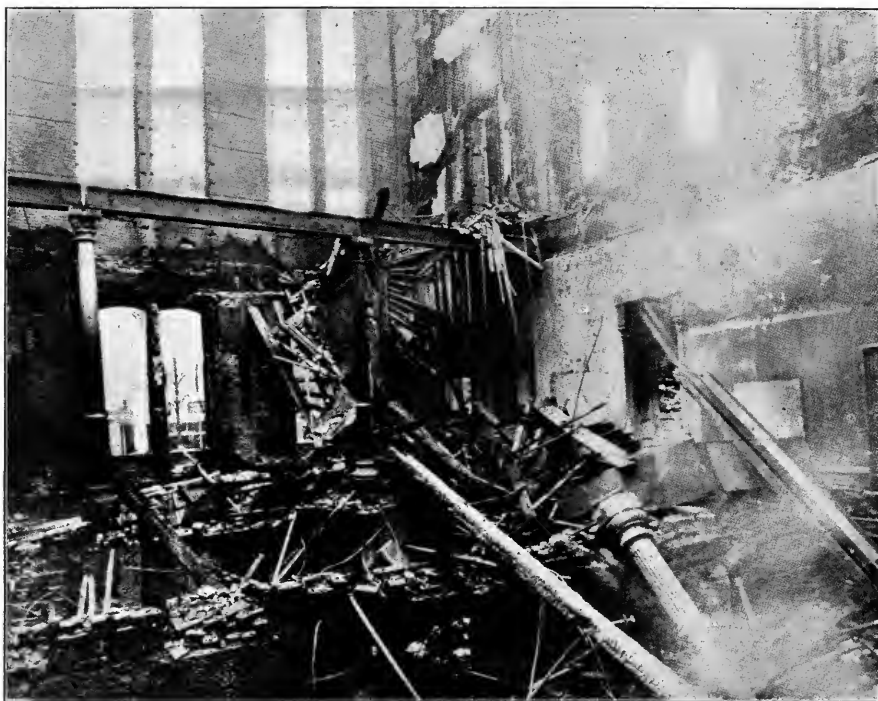
February 19, 1920. Augusta, Ga. Richmond County Court House. One 3-story building

damaged. Walls, brick, stucco finish. Floors, wood. Roofs, tin. Cause, unknown. Fire started in Judge Black's office, on second floor. Discovered by employe at about 8:45 P. M. Alarm, Gamewell box. Duration, 2 hours. Stopped in tower on roof. Fire was favored by construction of building. Private fire apparatus, none. Means of escape, 4 stairways. Value of building and contents, \$200,000. Property loss, slight.

February 29, 1920. Lebanon, Mo. Laclede County Court House. One 2-story building destroyed. Walls, brick. Floors, wood. Roofs, slate and tin. Cause, unknown. Fire started in court room. Discovered by passerby at about 4:30 P. M. Alarm, telephone. Duration, 1 hour. Stopped at ground. Fire was favored by construction. Firemen handicapped by light water pressure. Private fire apparatus, none. Value of building and contents, \$80,000. Property loss, \$80,000.

March 9, 1920. Philadelphia, Pa. Receiving room of United States Mint. One 3-story building damaged. Walls, stone. Floors, cement. Roofs, tin. Cause, gas explosion. Fire started, melting room, basement. Discovered by employe at about 3:45 P. M. Alarm, telegraph. Duration, 1 hour. Stopped at basement. Private fire apparatus, extinguishers. Persons in building, unknown. Killed, none. Injured, 1. Means of escape, towers. Property loss, unknown.

March 15, 1920. Raleigh, N. C. Administration building of state prison. One 4-story building damaged. Walls, brick. Floors, wood. Roofs, tin. Cause, unknown. Fire started in tower. Discovered by prisoner at about 3 o'clock. Alarm, telephone. Duration, 3 hours. Stopped at third floor. Firemen handicapped by laying lines across railroad track. Private fire apparatus, none. Value of building and



Courtesy Fire Protection

**RUINS OF THE WEST VIRGINIA STATE CAPITOL, CHARLESTOWN, DESTROYED BY FIRE
JANUARY 3, 1921**

Owing to the highly inflammable nature of the building, the progress of the fire before the alarm was received, the absence of division walls to the roof, and the total lack of automatic sprinkler systems, it is doubtful whether, with all engines and hose lines available concentrated on the narrow wing where the fire started, the structure could have been saved

contents, \$60,000. Property loss, \$15,000.

July 31, 1920. North Bessemer, Pa. Carnegie Library, Main Street. Public library. One 1½-story building damaged. Walls, brick. Floors, oak. Roofs, tile. Cause, lightning ignited gas. Fire started in basement. Discovered instantly. Duration, 1 hour. Stopped at attic. Confined to building. Private fire apparatus, extinguishers and garden hose. Persons in building, 10. Killed, none. Injured, none. Value of building and contents, \$10,000. Property loss, \$1,000.

September 23, 1920. Cheyenne, Wyo. State Capitol. One 4-story building damaged. Walls, stone. Floors, wood. Roofs, copper and slate. Cause, spontaneous combustion. Fire started in coal bunkers. Discovered by watchman at about 3:40 P. M. Alarm, telephone. Duration, about 3 hours. Fire was retarded by cement construction over coal bunkers. Private fire apparatus, hose, stand-pipes, chemicals inside. Persons in building, about 500. Killed, none. Injured, none. Means of escape, front, rear and side exits. Value of building and contents, \$750,000. Property loss, slight.

November 6, 1920. Halifax, N. S. City Hall. Offices fire alarm headquarters and police station. One 4-story building damaged. Walls,

stone. Floors, wood. Roofs, slate, tar and gravel. Cause, high voltage wires coming in contact with fire alarm wires. Fire started, third floor. Discovered by passerby about 9 P. M. Alarm, telephone. Duration, 45 minutes. Confined to lathing and switchboard. Firemen handicapped by dense smoke and delay in getting alarm. Private fire apparatus, stand-pipe. Persons in building, janitor and family of 7, 6 policemen on ground floor. Killed, none. Injured, none. Means of escape, doors. Value of building and contents, \$300,000. Property loss, slight.

December 27, 1920. Chicago, Ill. Building at 17-25 West Elm Street. Engineering and appraisers' offices. One 4-story building damaged. Walls, brick. Floors, wood. Roofs, gravel on trusses. Cause, cigarette stub in dumbwaiter shaft. Discovered by occupants at about 4:40 P. M. Alarm, street box. Duration, about 1½ hours. Stopped at third floor. Private fire apparatus, chemical extinguishers. Persons in building, 12. Killed, 1. Injured, 2. Means of escape, inside stairs and fire escape. Value of building and contents, \$125,000. Property loss, about \$25,000.

ACKNOWLEDGMENT.—The records of fires are furnished through the courtesy of *Safety Engineering*.

A City's Care of the Sick

By Henry C. Wright

Director, Hospital and Institutional Bureau of Consultation, New York City

THE obligation of the city to care for those who have become sick and thereby helpless is generally accepted. The methods adopted, however, vary. One or more of the following procedures is usually followed.

When Should a City Build a Municipal Hospital?

Some of the sick cannot be cared for in their homes, owing to the nature of the sickness or to domestic conditions. For such sick, hospital care is needed. Shall the city depend upon private benevolence to provide hospital beds for the dependent sick? This is a question which each city must answer for itself. Nearly all large cities, and a fair proportion of the smaller cities, have accepted the obligation to pay for the care of the dependent sick, either in municipal or in private hospitals.

Moreover, a newer question is pressing to the front to-day. How are the middle classes to get hospital care? In most cities the number of hospital beds is insufficient. Inasmuch as the private hospitals depend largely upon the income from patients to defray operating expenses, they are under the constant temptation to accept those who can pay well. They also accept a certain number of free patients, as provided by deeds of gifts or by public donation. The middle-class patients who could pay a small fee, but not the full charge, are in most cases excluded for lack of available beds. Moreover, the few hospital beds, being in great demand, are largely filled by surgical cases to the exclusion of medical cases, which do not seem so emergent, yet will probably be ultimately in great danger. This was most obviously the situation in a city of 300,000 recently surveyed by the writer.

How are these middle-class people to secure hospital accommodation? Private benefaction is not likely to supply the need. A governmental service seems to be the only recourse. The beds must be furnished by a city or a state. There seem to be no fundamental reasons why a city should not furnish a bed to a patient who can partly pay for it, as well as to a patient who can pay

nothing. In many regards the need of the part-pay middle class is more urgent than that of the no-pay dependent class. If this obligation be recognized by cities, as it probably will be, the open-ward plan heretofore almost universally adopted in municipal hospitals will probably be modified so as to provide some semi-privacy.

When should a city build a hospital? This is a question not simply answered. A general conclusion which should be kept in mind is that a hospital having less than two hundred beds cannot readily maintain a training school for nurses, nor provide, except in small cities, a sufficient variety of cases to attract the best surgical and medical practitioners. If private hospitals already exist and would benefit by enlargement, if the building of a municipal hospital would only increase the number of small hospitals, then, under such circumstances, consideration should be given to the proposition to subsidize one or more private hospitals. Such a procedure should be adopted, however, only when the private hospital will agree to make reports to the city which will give full information as to its expenditures and the character of its surgical and medical service. Moreover, a subsidy should always be on a per capita per day basis, and not on the basis of a flat yearly contribution.

If private hospitals will not agree to furnish full reports, with the added privilege of periodic inspection of the plant, then the city should consider the erection of a municipal hospital to safeguard its expenditures, and to insure proper care of its patients.

If a municipal hospital is to be built, its management should be so formulated as to render political interference unlikely. A medical board composed of members appointed through political influence will not give good service. When tenure of service on the staff is uncertain, good medical work cannot be expected or secured.

How Shall a City Maintain an Ambulance Service?

It is necessary in every city, other than a very small one, to transport accident cases,

and a portion of medical and surgical cases, to one or more hospitals. In some cities this is considered a function of private ambulance firms, and the city furnishes no service except such as it may render by an ordinary police wagon. In other cities an ambulance is operated by the city through the police department. In some of the larger cities all ambulances are operated by hospitals.

If a city recognizes it as duty to care for the sick in a hospital, there should be recognized as a corresponding obligation some form of ambulance service. In determining how ambulance service should be rendered, this fundamental fact should be taken into consideration. No ambulance service is adequate unless accompanied by an ambulance surgeon. When an ambulance is operated by a private firm or by the police department, it is seldom practicable to have the ambulance accompanied by an ambulance surgeon. In one city where the writer made a survey of hospital conditions, during the year previous about twenty-five babies had been born in the police ambulance en route to a hospital, without the attendance of a physician. Obviously this was bad service.

Since a surgeon or physician should al-

ways accompany an ambulance, it practically renders it necessary to have all ambulances operated by hospitals, because its staff can be called upon to furnish such service.

If a city operates a municipal hospital, it will probably operate one or more ambulances in connection with it. If no municipal hospital exists, it is feasible to subsidize a private hospital ambulance to care for all city cases. New York City, for instance, operates about twenty-five ambulances in connection with its municipal general hospitals. As a supplement to these, it pays to private hospitals about \$1,500 yearly for each ambulance operated. The amount varies somewhat with the type of ambulance used. An Ambulance Board regulates the operation of these private ambulances. The system is very satisfactory.

A small city could advantageously adopt the plan of subsidizing an ambulance of a private hospital. It is highly advisable to discontinue any pretense of ambulance service on the part of the police department, both because medical service cannot be provided by the department, and also because there is some stigma attached to a police vehicle, even though it be an ambulance.

Public Comfort Stations of England

Describing Typical Design and Construction in English Comfort Stations
and Methods of Adapting Them to Locations

IN the principal cities and towns in England underground or semi-underground lavatories with toilet accommodations are to be found in all busy areas, and especially is this so in business districts.

The typical lavatory is a chamber wholly underground, which receives its source of light from transparent materials at the street level. Naturally this medium of transmitting the light must be strong, but in the general planning of these public conveniences the idea is to arrange the exit and entrance in such a way that there will be no need for horse or car traffic to cross over between the points of access.

With this idea in view, many of the surveyors arrange the street lights of the

lavatory 6 inches above the level of the street, so that the side lines of the roof of the lavatory are finished in the same way as the footway at the sides of the street. In other words, the roof of the lavatory becomes an island footway in the street so that passengers crossing from one side to the other between the two may rest while a moving vehicle is passing.

Of course a number of these conveniences are planned with a roof which may be anywhere from 3 to 4 feet above the level of the street. The reason for raising the roof into the space of the thoroughfare is in most cases due to the fact that it is necessary to raise the floor to allow the lavatory to be efficiently drained.

Interior Arrangement

In many districts the outfall of the sewer is comparatively shallow, and therefore these street lavatories have to be arranged, in ordinary circumstances, so that the drainage from the convenience can be taken into the existing sewer. In most cases the underground lavatories which are being erected at the present time consist of a hand wash-room, simply provided with one or more wash-basins, towels, pin-rails and a looking-glass or two. A water-heater is generally fitted up in the caretaker's room, and the medium of heating is an electric radiator. A few water-closets are arranged along one side of the room, while on the opposite wall are the stall urinals. The water-closets and urinals are arranged as near the entrance as possible, with the street lights immediately overhead.

The entrance to these lavatories is regulated very much by the width of the street, and a narrow thoroughfare has the stair arranged in one flight. Where the width of the street will allow it, or in the case of a dead end in a side street of a main thoroughfare, a double flight is to be recommended as being safer for elderly people and because the landing between the two flights provides a rest for those who are unable to make the entire trip without stopping.

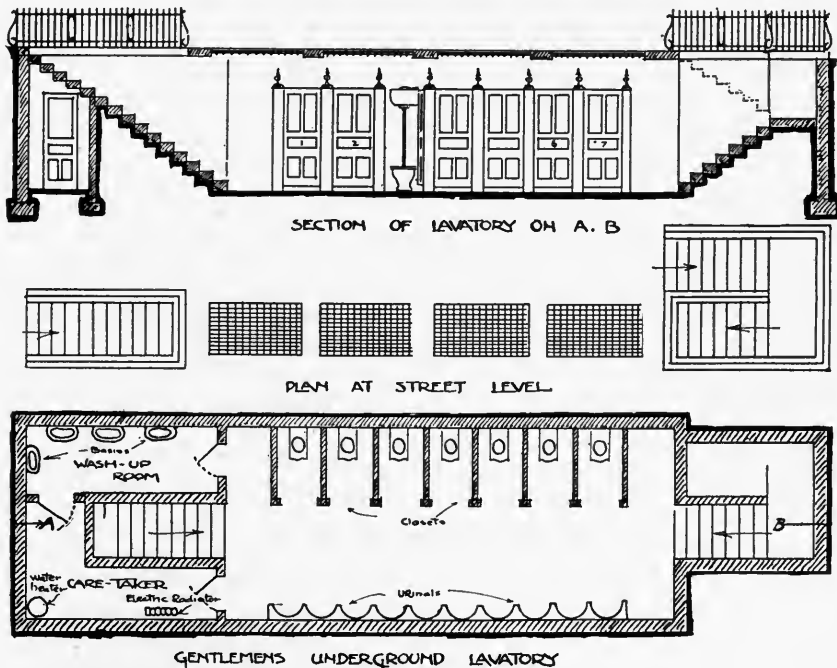
The specially devised urinals which are fitted up in most public lavatories are made of fire clay, heavily enameled. Formerly these were made of slate and sometimes provided with a porcelain basin. But the difficulty with that material was it soon became coated with uric acid and became extremely offensive, and the porcelain basin with its grated outlet, small waste pipe and feeble flushing apparatus was often worse than useless.

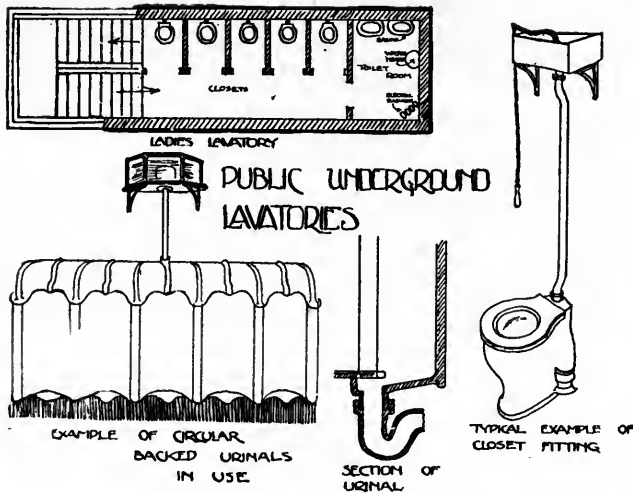
The most improved form of urinal consists of a semicircular back of enameled fire clay with a dish at the floor level of the same material. The latter drains into an open trap which is connected with the drain. The whole is flushed with an automatic cistern above, which is connected up with the flushing rim of each urinal. Though in a urinal of this description there is a large exposed area likely to get soiled, the absence of any corners and the frequent flushing of the enameled surface keep it perfectly inoffensive.

Experience has taught that this kind of urinal is very much better than the trough kind, and where they are placed in a freely ventilated lavatory, the result is very satisfactory.

Taking Care of Waste

The waste from these urinals is taken di-





Each basin has a hot and a cold tap. The hot water is run off from the heater, which is under the care of the janitor. The water heater is in some cases electrical, but most generally gas is used and proves less expensive.

The usual apparatus is a cylindrical casing made of fire clay, supported on two brackets fixed to the wall. On the underside of the fire clay is the gas burner, and inside the fire clay is a very closely wound $1\frac{1}{2}$ -inch copper pipe coil, onto which the gas flame plays. The pipe

coils is connected up to the flow pipe to the basin, so that it is only when the toilet room is in use that the water heater is lighted. The lavatories are all lighted with electricity, and an electric heater is as a rule fitted up in the caretaker's room.

The General Structure

rectly into the drain and each stall trapped off separately. The waste pipes from the urinals are connected up with the soil, while the waste pipe from the basins, which is termed the hot soapy waste pipe, is kept by itself.

In linking up the basin waste with the soil drain, a disconnecting trap is put in close up to the urinal and closet drain. The ventilating eye is taken up to the street level, so that a complete severance is formed between the two classes of waste.

The range of closets which are shown in the two illustrations are of the wash-down pattern. The outside and inside are enameled and are as white as can be made. The trap from each is taken into the soil drain which runs along the back wall. In all cases a simple rim seat is used which follows the curve of the basin and is hinged at the back. The flushing cistern is set above the closet from 6 to 7 feet above the floor level, according to the needs of the fitting and mechanism, and the $1\frac{1}{2}$ -inch flush pipe is fixed on the face of the wall. In the toilet room the number of basins in the range is generally fixed according to the size of the lavatory. Four basins is quite an average number.

Brick and cement or concrete form the principal material for the fabric, and where there is any sign of dampness or water, a vertical layer of asphalt between the outer and inner thicknesses of the wall makes the apartment fairly dry.

The roof is of steel frame and cement of sufficient strength to carry foot traffic in safety, and the glass lights are protected by a metal frame. In this class of work the joints between the pavement lights are very often a source of trouble, and this is best overcome by careful bedding in position at the time of setting.

The basins are usually of the one-piece pattern and made from fine clay and glazed. The most simple and satisfactory form is a lavatory basin which has a downright overflow, as it has been found that overflows which are formed by a cluster of holes in the side of the basin leading to a small pipe connected to the waste pipe at some point below the basin are a source of nuisance.

The floors are of tile or cement, and all drains should be laid before the floor is bot-tomed. This will be quite easily followed when it is considered that all drains are inside the walls of the lavatory, the only part where they pass outside being at the outfall where they are connected up to the sewer, and at the top end where the drain is carried through the wall and across the street to the adjacent building, where the vent pipe is carried up to the roof.

The walls of the dividing partition are

generally built of double white enameled brick, and in the case of the dividing partition in the closets these are built 6 inches clear of the floor. The idea is to have as few corners as possible, and with this in view, many of the internal angles of the tile work are finished with curved corners. The ceiling is finished with cement, and, with the

exception of the doors and their finishings, there is very little woodwork.

The inside of the lavatory is finished in white, which, along with the light which passes from the outside through the pavement lights, makes a well-lighted underground compartment.

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Solving the Garbage Collection Problem in Highland Park, Michigan

Dead Ends and Narrow Alleys Require Special Equipment for Waste Collection

THE city of Highland Park, which is entirely enclosed by the corporate limits of the city of Detroit, Mich., has solved its garbage collection problem in a rather unique manner. The former city is entirely residential, having no manufacturing plants, with the exception of the Ford Motor Company and the Maxwell Company. It has a density of population of approximately 35,000 people to the square mile.

For some time the city of Highland Park sold its garbage to a well-known pig farm, but because of the continuous growth of the population, it became a public nuisance and was discontinued. At that time garbage was trucked about 18 miles to the pig farm with large motor trucks and trailers. A great number of the alleys in which the garbage was gathered have dead ends adjacent to the city of Detroit and because of this it is almost impossible to use large trucks in these alleys. R. R. Hughes, Superintendent, Department of Public Service, used for a large part of the collection work trailers having 3 to 5-yard garbage bodies, but it was impossible to haul these large trailers through the alleys with either horses or trucks. Consequently, a light truck was developed which was narrow enough to work readily in the alleys, and the body of which was made in such a manner as to eliminate the cost of shoveling from one truck to a trailer or heavy motor

truck for transporting the garbage to a loading station approximately two miles away.

This high-lift truck was built by the Mansfield Steel Corporation, Detroit, Mich. One of its novel features is the pocket in the bottom of the body with a capacity of about 60 gallons of water. This is included because a great deal of household garbage is very wet and the water naturally drains toward the bottom. The pocket prevents any possibility of spilling the water along the streets from the rear end of the truck. The high lift of the body makes it possible to empty the garbage readily into one of the large trucks, without any shoveling except to better distribute the load in the larger truck. On the light truck steps are provided so that when there are heavy cans of garbage the two tenders have additional advantage in dumping the garbage into the truck, as they can get up onto the step and easily lift the can up over the edge. These steps fold up out of the way when not in use. The height of the top of the body from the ground is 59¾ inches, and the body is mounted on a 2-ton truck. The maximum time necessary to unload the small truck into the larger one is about 3½ minutes. The use of these in the city of Highland Park has resulted in a saving of \$65 to \$70 per day. Also, they have eliminated the use of the loading plants formerly in service.

Motorization Reduces Garbage Collection Complaints

Under the contract system of garbage collection in Indianapolis an average of 200 complaints were received each day, while under municipal collection with trucks and trailers only 10 are received each day from the 70,000 homes served.

Some References on Rural Plannin and Development

Prepared by Theodora Kimball

Librarian, Harvard University School of Landscape Architecture; Honorary Librarian,
American City Planning Institute

THE subject of rural planning and development is attracting increasing attention in America. At the present time the Bureau of Farm Management and Farm Economics of the U. S. Department of Agriculture (Dr. C. J. Galpin, Director) has projected a series of four bulletins, approaching the subject from its social side, which are intended to demonstrate that planning is fundamental to the improvement of rural life. It was in response to a request from this Bureau that the writer prepared the following list.

In addition to the references more specifically designated as dealing with rural planning, there are here included: (1) several discussions of national and regional planning and of garden cities—subjects essential to be considered in the organization of non-urban land in itself and in its relation to the organization of adjacent areas; (2) a few references on "rural improvement," commonly understood to mean both the improvement of the rural landscape and of rural social conditions; and (3) a considerable list of references on land settlement—inevitably an integral part of rural development programs. It has not been possible to include groups of references to sub-topics such as farmstead improvement and rural community centers (promoted by the U. S. Department of Agriculture—Divisions of Horticulture and Rural Engineering,—state agricultural extension services, and state granges), rural highway improvement (furthered by the U. S. Office of Public Roads), etc.; nor can there be included references on certain basic considerations in a rural layout plan; such as rural motor transportation, represented, for instance, by Bulletin 770, U. S. Department of Agriculture: "Motor Transportation for Rural Districts," by J. H. Collins.

The most important single book mentioned below is the Canadian report of 1917 by Thomas Adams, given first on the list, which covers land classification, land settle-

ment, the rural survey, and the rural plan. The work of Dr. Elwood Mead on the California State Land Settlement Colony, at Durham, is also of major importance. Somewhat analogous to this colony is the agricultural community near Wilmington, N. C. (for information address its prime mover, Hugh MacRea, Wilmington, N. C.), where an even more extensive and unified rural community is projected for the near future. The movement in Wisconsin, fostered by the State University (address Professor F. A. Aust, Madison, Wis.), and expressed in the county planning law passed by the state and by the voluntary efforts of the "Friends of our Native Landscape," should be followed with close attention. The program of the American Civic Association meeting at Amherst in October, 1920, was devoted to "Country Planning," but most of the papers are not yet available in published form. This meeting was under the direction of Professor F. A. Waugh of Massachusetts Agricultural College, at Amherst. (See his publications mentioned below.)

The following American associations have shown an active interest in rural planning and improvement: American Civic Association, Union Trust Building, Washington, D. C.; American Society of Landscape Architects, 99 Warren Street, Brookline 46, Mass.; American Country Life Association, E. C. Lindeman, Greensboro, N. C.; Community Service (Inc.), 1 Madison Avenue, New York City (community organization), National Grange, Executive Council, Washington, D. C.; Women's National Farm and Garden Association, 414 Madison Avenue, New York City.

The following American periodicals should be scanned currently for news items in this field: *THE AMERICAN CITY* (monthly), Tribune Building, New York City; *Landscape Architecture* (quarterly), 15 East 40th Street, New York City; *National Municipal Review* (monthly), 261 Broadway, New York City. *The Survey*

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Universal Physical Education for Children

More Than One-Half of American School Children Are Below Par Physically

By E. Dana Caulkins

Manager, National Physical Education Service, Playground and Recreation Association of America

THE Chamber of Deputies of the National Legislature in France recently passed unanimously a law requiring physical education for all children through the sixteenth year. It is a significant fact that one of the early reconstruction moves of France is in the interest of upbuilding the physical vitality of her youth. Ambassador Jusserand recently made a statement that France, while needing money and needing the reconstruction of her devastated regions, needs most of all her children, the one hope of the future.

No argument is required to prove that in order to build up the physical vitality of the nation, it is necessary to provide training for the health and normal physical development of the youth. Japan has been doing this for twenty years. Sweden has had universal physical education for a long time. England now provides federal coöperation with local communities in providing physical education.

The publication of the draft statistics, showing that more than one-third of the young men examined were disqualified from full participation in the recent war, shocked us. The publication of the results of school health surveys, showing more than one-half the school children of our nation below par physically, shocked us again. Shall we blindly continue believing that tariffs and taxes, shipping and industry must get first attention? We are beginning to recognize that we must do everything possible to promote the physical fitness of our youth if we are to be a nation strong for peace-time production and strong against the emergency of war.

The Republican Platform of 1920 included endorsement of physical education. Congressman Fess of Ohio has introduced a bill, H. R. 22, identical with the bill introduced by Senator Capper, which proposes that the Federal Government shall coöperate with the states in extending the opportunities of physical education to all the children of the nation. At present, not more than one-tenth of them are getting physical education. The results are shown in the draft statistics and the school health surveys.

The business men of the nation are flooding Republican leaders with suggestions for the solution of the problems of taxes and tariffs. What is being said about universal physical education? We cannot ignore the fact that the ultimate goal of tariffs and taxes, and any other material adjustments, is the promotion of the happiness and power of the nation. We are blind if we do not see in physical education a tremendous force working directly for the promotion of happiness and power for service, and also working indirectly to the same ends by increasing productive power, promoting a wholesome, optimistic outlook upon life, and laying the basis for a powerful independent nation.

Wise economy involves wise investment. By raising the standard of physical efficiency throughout the nation as little as 1 per cent, the entire cost of the universal physical education program would be more than counterbalanced. It is inconceivable that the United States of America will do less to promote the physical power and individual happiness of her citizenry than the poverty-stricken nations of Europe are already doing.

War vs. Carelessness

In 18 months of the bloodiest and most terrible war the world has ever known, 48,000 Americans lost their lives amid the hail of billions of scraps of steel and leaden balls. In one year—every year—20,000 Americans are killed by fire. There was a reason for the loss in battle. There is no excuse for the loss at home. The loss of 48,000 was to make the world safe for posterity; the loss of 20,000 is due to carelessness; it is the suicide of ignorance.

New York's Meter Investigation

By J. Bayard Kirkpatrick

IN the recent investigation of water meter manufacturers by the Lockwood Committee of the New York Legislature, which is engaged in probing the housing situation and a charge that a discrimination exists against certain makers, the Committee's counsel, Samuel Untermyer, tried to make it appear that the action of the Board of Aldermen in excluding the Badger water meter from New York City was inspired by the Meter Manufacturers' Exchange, an organization composed of the following companies: Worthington Pump & Machinery Corporation, Harrison, N. J.; Union Water Meter Company, Worcester, Mass.; Neptune Meter Company, New York City; Thomson Meter Company, Brooklyn, N. Y.; Pittsburgh Meter Company, Pittsburgh, Pa.; Hersey Company, South Boston, Mass.; Buffalo Meter Company, Buffalo, N. Y.

While the Committee uncovered considerable irregularity among labor unions and dealers in various materials and in building construction, naturally stirring up strong public sentiment against any proposition taken up, no evidence direct or otherwise was introduced at the hearing that would show that the Exchange or its members had actually brought any such influence to bear upon the Board of Aldermen. The only ground for such an impression was the Board's refusal to approve the meters manufactured by the Badger Meter Company as suitable for installation in New York City. While it was stated at the hearing that only the meters manufactured by members of the Exchange could do business in New York, as a matter of fact one of the independent companies, the National Meter Company, supplies meters for city use and has done so for years. The Badger meter had been approved by the Commissioner and Chief Engineer of the Department of Water Supply, Gas and Electricity of New York City, but owing to the fact that a bill passed by the New York Legislature putting the final approval for meters to be used in the hands of the Chief Engineer of this Department and taking it away from the Board of Aldermen was vetoed by Mayor Hylan, it failed to become a law. This, it

was also insinuated at the hearing, was the result of the opposition to the Badger meter. No rebuttal of testimony was offered at the Lockwood Committee hearing.

Since that hearing it has been freely stated by a representative of the Badger Meter Company that he had been approached with a bribe, the solicitor of the bribe stating that unless it were received no favorable action by the Board of Aldermen could be expected.

The Meter Manufacturers' Exchange, which is one of nine similar exchanges of which A. A. Ainsworth is secretary and Clark McKercher is counsel, held a special meeting on May 6 at which it was decided to abandon, as demanded by Mr. Untermyer, counsel for the Lockwood Committee, and upon the advice of counsel, the reporting of open-price competition, and that the members discontinue sending to the office of the Exchange all reports on bids, contract memoranda and daily report of orders and shipments. This fact did not interfere with other activities of the exchange such as standardization, credit reports, cost accounting, freight matters, labor problems, taxation, and the wide variety of other subjects already found to be of real benefit.

It was understood that this practice, which has been abandoned and which constituted only a small part of the work of the Exchange, is discontinued only until the legality of the procedure is passed upon by the United States Supreme Court. In the opinion of Mr. McKercher, the counsel, the plan is entirely legal. The Meter Manufacturers' Exchange, as referred to heretofore, has many more important functions than the price-reporting plan, one of the most useful of which is the effort to work out standard specifications and guarantees for water meters, the purpose being to do away with costly results due to special design required to meet the irregular specifications and guarantees constantly being written by municipal engineers. It secured the appointment of the joint committee on a standard meter specification in both the American and the New England Water Works Association.

Forward Steps in Municipal Affairs

Police Departments

Increased Police Force Checks Crime

DETROIT, MICH.—During the past year there has been a great deal of discussion of "crime waves" in American cities, but in relatively few instances has there been an opportunity for the public to study analytically the actual statistics of crime and the measures adopted for its suppression. For the purpose of better informing the citizens of Detroit, the Police Department decided to issue a bulletin, giving briefly the figures showing the extent of crime during the past year as compared with previous years, the methods adopted by the Department in improving the situation, and the result achieved.

The four major crimes by which the crime condition of a city is generally gaged are: breaking and entering dwellings; breaking and entering business places; robbery; and larceny from the person; the term "robbery" covering all hold-ups or robberies in which assault or violence plays a part, and the term "larceny from the person" covering the work of pickpockets, etc.

In common with most American cities, Detroit suffered from a so-called crime wave during the last half of 1919 and the first half of 1920, the condition in September, 1920, having reached a point where crime was more prevalent than it had previously been in the recent history of the city. During that month it was decided to materially increase the force of men available for street patrol and to institute a special campaign for the purpose of rounding up criminals and decreasing crime in the city.

The results achieved in this campaign are exceedingly interesting and tend to

demonstrate the fact that the reduction of crime waves is simply a question of effort and sufficient available force.

Beginning in September, with the number of crimes in that month far in excess of any previous September, a steady reduction of crime was brought about, until the first months of this year showed a lower crime record than any corresponding months for a number of years. Instead of the increase in crime which generally takes place during the last quarter of the year, a material decrease was brought about. For instance, in the crime of robbery for the four previous years the average number of crimes committed in December was 69 per cent greater than the September average, while in 1920 the number recorded for December was 51 per cent less than in September.

As to the general result brought about, the following comparative table showing the prevalence of crime during the first quarter of each year for the period of 1917-1921 is enlightening:

Breaking and Entering Dwellings		1917	1918	1919	1920	1921
January	.....	95	143	131	64	38
February	.....	77	155	130	78	42
March	.....	125	130	152	99	29

Breaking and Entering Business Places		1917	1918	1919	1920	1921
January	.....	124	162	114	99	35
February	.....	96	173	81	99	46
March	.....	109	78	85	106	40

Robbery		1917	1918	1919	1920	1921
January	.....	85	83	62	112	53
February	.....	50	99	53	98	35
March	.....	60	51	40	74	17

Larceny from the Person		1917	1918	1919	1920	1921
January	.....	44	51	59	46	37
February	.....	77	45	42	39	19
March	.....	80	83	77	63	19

The credit for this gratifying condition should not be given entirely to the Police Department, but to the combined efforts of and the complete coöperation existing between the Department and the new Municipi-

pal Court, which, since its inauguration in April, 1920, has been dispensing justice in a manner calculated to vividly impress the underworld. There is no doubt, however, that the principal factor in bringing about the changed condition has been the increased number of men which the Police Department has been able to detail for street patrol and intensive work on crime prevention.

On September 1, 1920, the number of officers ranking as patrolmen was 1,153, or 198 short of the regular quota provided for in the budget. This number was gradually increased, until on January 1, 1921, the deficiency had been made up and 132 auxiliary officers had been included, giving an increase of 330 patrolmen over the number available on September 1. While this increase added less than 30 per cent to the number of patrolmen employed in September, it meant an increase of nearly 50 per cent in the number available for street patrol, as a large part of the personnel is always of necessity assigned to various special details.

In addition to this increase a number of volunteer reserves were used during several evenings of each week, thus further augmenting the night patrol. It is interesting to note that the number of street and other robberies decreased and the condition, as compared with the corresponding months of previous years, improved as the street patrol was increased.

In September, 1920, with a shortage of 198 men, there were 98 robberies committed in Detroit against an average of 55 for September of the four preceding years. In October, with a shortage of 170 men, there

were 74 robberies against an average of 61 for the four previous Octobers. In November, with the shortage entirely made up and reserves called into service, there were 55 robberies against an average of 92, and in December, with the number of patrolmen brought up to 132 in excess of the regular quota, there were 48 robberies against an average of 93 for the same month of the previous four years.

These figures demonstrate that there is a closer relation between the number of policemen and the frequency of crime than is usually supposed, and go far towards indicating the remedy during the presence of so-called "crime waves."

JAMES W. INCHES,
Commissioner of Police.

City Engineers

Ridding the City of Tin Cans

HAVRE, MONT.—A recent suggestion of the Fire Chief to the City Council of Havre was well taken. It was agreed by the Council that two cents per dozen for old tin cans would be paid by the city for all old cans picked up within its limits and delivered to a place designated by the Chief of the Fire Department.

The tin can campaign was well advertised in the daily paper beforehand. One of the notices ran as follows:

BOYS, BRING YOUR CANS

The city of Havre will pay two cents per



TEN TONS OF TIN CANS WERE COLLECTED BY THE BOYS AND GIRLS OF HAVRE, MONT.

dozen to all boys and girls picking up old cans in the streets, alleys or vacant lots of the city or in Bull Hook Creek and taking them to the Chief of the Fire Department at the City Hall.

All cans must be gathered inside of the city limits.

They must be at the City Hall to-night at 5 o'clock.

The pile back of the City Hall was evidence that this raid on the old cans by the boys and girls was a most successful one. One hundred and thirty-one of the young Americans were real business people for at least two days. One hundred and fourteen boys and seventeen girls busied themselves in picking up old cans from all nooks and corners of vacant lots and other neglected spots in the city. There were no less than 300 trips made to bring the cans to the City Purchasing Agent. One enterprising small boy four years of age made twelve trips with cans carried in a sack to the rear of the City Hall. He averaged 5 cents per trip and received a total of 60 cents for his two days' work.

The largest money-maker in this campaign received \$2.88 for his labors. This boy with several companions hauled his cans in an old spring-wagon which the boys pulled to the place of disposal of their sale.

All sorts of vehicles were put into action by the boys in hauling their cans. Old baby-buggies, wheelbarrows, express wagons, carts of various kinds, and in quite a number of cases the fathers with their machines, were pressed into service.

The campaign cost the city \$109.60 in cash besides the cost of hauling 7½ truck

loads of old cans to their final place of disposal. For hauling these cans a temporary box was built in the iron gravel body of the Nash Quad truck, which held 12½ cubic yards of cans. A total of 65,700 cans, or 10 tons in weight, was picked up within the city after the regular clean-up week. So far as old tin cans are concerned, Havre is now one of the cleanest cities in the state.

H. R. MEYER,
City Engineer.

Departments of Education

An Up-to-Date Public School Building

PIPESTONE, MINN.—The Pipestone Junior-Senior High School was constructed during the years 1918-19 and completed September 1, 1920. The architect was G. L. Lockhart, and the builder was L. P. Jorgenson, both of St. Paul. The cost was approximately \$400,000.

The outside dimensions are: length, 228 feet; depth, 175 feet. The building contains three floors and occupies an entire city block. The ground floor has twenty-three rooms, consisting of suites for manual training, physical science, agriculture, commercial training, domestic science, cafeteria, auditorium, and gymnasium. The first floor has twenty rooms, consisting of the superintendent's office and board room, grade rooms, nurse's office and kindergarten. The



THE PIPESTONE, MINN., SCHOOL MEETS THE NEEDS OF A MODERN COMMUNITY

second floor has twenty-eight rooms. These are Junior and Senior High School study halls, principals' offices, recitation rooms for High School and Junior College instructors, school for special pupils, normal training room, music room, drawing-room, library, reading-room and rest rooms. The balcony of the auditorium is between the first and ground floors. The total floor space in the building is 66,580 square feet.

The building is fire-proof in construction, with board floors in the schoolrooms and mastic-covered concrete floors in halls and auditorium. The outside walls are of pipe-stone up to the second floor, with brick the rest of the way. The trimmings are of Bedford stone.

The auditorium has a seating capacity of 1,000. The stage is 20 feet deep, with a proscenium opening of 37 feet and a height of 28 feet. It is fitted with complete scenery and has four dressing-rooms. All High School students meet here each day for thirty minutes to listen to and render music, declamations and discussions. Prominent people of the town and from outside frequently give addresses at this time.

About a dozen plays have been presented by various student organizations, especially the public speaking classes. Band concerts and other local entertainments are given in the auditorium.

The gymnasium is 86 feet by 56 feet and has seats for 1,000 people. It is fitted with two rooms containing lockers, shower-baths and toilets. The showers have 24 private dressing-rooms. There are 600 lockers in these rooms. The swimming pool is 67 by 17 feet. The usual student activities are carried on in the gymnasium. In addition, the American Legion and town basket-ball teams practice and play here.

In 1917 the former high school building was burned. The people of the community were unanimous that an up-to-date building, adequate for several years to come and representing the latest thought in buildings, should be erected. The result is this building, which is the equal in efficiency and housing capacity of any other in the state.

There are thirty-four teachers in the faculty. The course ranges from the kindergarten to the first year of Junior College, and there are 1,000 students in attendance. Graduates of the Junior College are admitted to the colleges and state university without examination.

A. C. TIBBETTS,
Superintendent, Pipestone Public School.

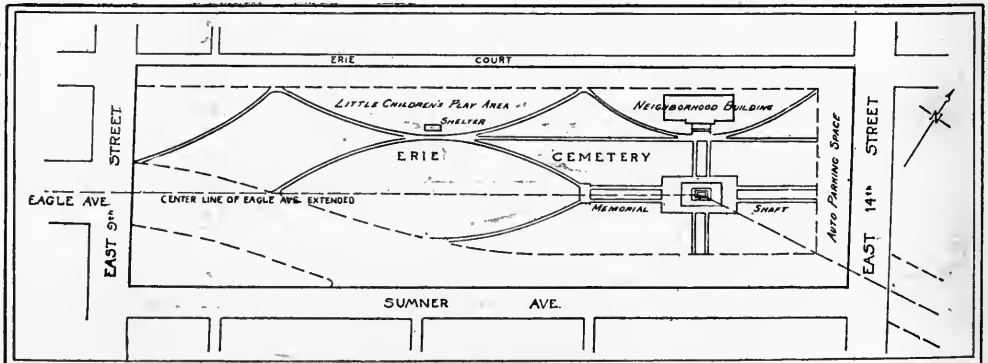
City Planning Commissions

Cleveland's Competition of Ideas

CLEVELAND, OHIO.—Near the down-town business section of Cleveland, lying directly in the right of way of the proposed and urgently needed new thoroughfare, is an old burial ground known as the Erie Street Cemetery. This burial ground, originally used for burial of Cleveland's pioneer settlers, has of late years been largely discontinued, many of the bodies having been removed.

The cemetery is rectangular in shape, occupying an area of nine acres. Surrounding the cemetery are small stores, boarding- and rooming-houses. At present the neighborhood is in a transitional stage between the older use of the area for homes and the future use of high-class mercantile business.

The proposed Carnegie Avenue extension



THE WINNING PLAN IN CLEVELAND'S COMPETITION

down-town, connecting the west and east sides of Cleveland across the Cuyahoga Valley, will pass directly through the cemetery. This extension, passing over the newly authorized Huron-Lorain Bridge, will provide a continuous flow of traffic, uninterrupted by street cars and slow-moving vehicles, materially reducing time required for through town traffic.

In an effort to advertise city planning to the people of Cleveland and to crystallize public opinion as to the proper use of the cemetery, the Cleveland City Plan Commission organized a competition of ideas in regard to the disposal of the burial ground. The terms of the competition were so arranged that individuals without technical training were not handicapped. The idea alone was considered in the judgment; thus a merely written presentation received as much attention as those elaborately drawn.

Each competitor was permitted to present three different plans, and each one was permitted to submit his proposal covering all phases or one phase of the problem as outlined by the statement of the competition. To insure interest and a large number of competitors, a cash prize of \$500 was offered.

The definite results obtained were: a large number of opinions as to the route of Carnegie Avenue (extended) through the Erie Cemetery; several methods of making the actual connection of Eagle and Carnegie Avenues when the latter is extended; and many suggested uses of land not used by the thoroughfare—that is, as to whether it should be developed into playgrounds, a park, or an architectural court, etc. Opinions were also given as to a fitting memorial for the pioneer settlers, its location and type.

The jury, composed of a representative body of Cleveland's citizens, spent considerable time in awarding the prize and the honorable mentions. Before final decision was rendered, the entire set of plans were reviewed. The jurors, one each appointed by the Mayor, the City Council, the Chamber of Commerce, the West Side Chamber of Industry, the Cleveland Chapter of the American Institute of Architects, the Engineering Society, the Real Estate Board, the Cleveland Welfare Federation, and the Western Reserve Historical Society, proceeded first by dividing the plans into classes determined by the proposed location of the roadway, and then determining the best solution in that class. All other classes

were considered, however, and honorable mentions were given to the best of the various classes.

The features of the winning plan were the extension of Carnegie Avenue along Sumner Avenue, cutting through the cemetery to meet Eagle Avenue at East 9th Street, so that the greatest economy in the use of land was effected. A tall shaft for memorial purposes was located at the intersection of the axis of Carnegie Avenue and Eagle Avenue, to be visible from a distance, making effective vista terminations. The rest of the area was developed into an open breathing space or "in-town" park. In justice to other competitors, it must be stated that the pathways proposed were not as good as others, but it was the only plan proposing an effective memorial coupled with the type of traffic disposal considered most feasible by the jury.

The prize was awarded to Philip W. Foster, of Harvard Square, Cambridge, Mass. Two mentions were given in the same class as the winner, and seven in other classes.

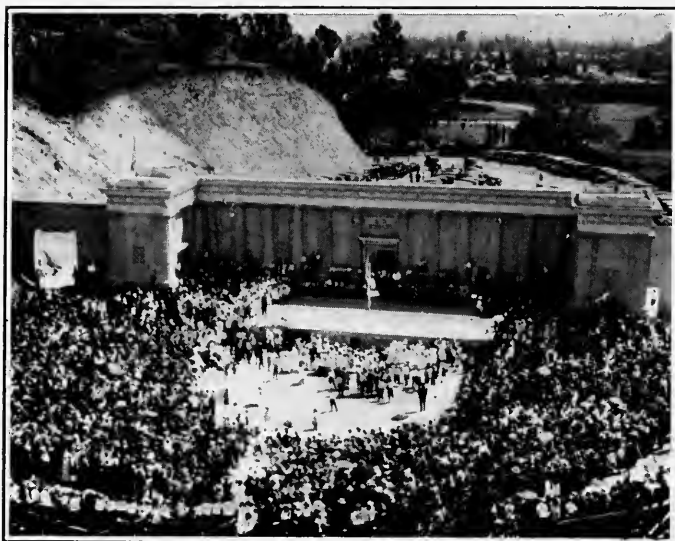
WILLIAM A. STRONG,
Landscape Architect, City Plan Commission.

Public Welfare Departments

"America Day" in Pomona, Calif.

POMONA, CALIF.—About 5,000 inhabitants of this community gathered in its beautiful outdoor Greek theater in the heart of its 60-acre park on May 2 to celebrate America Day. The celebration, which was originated by the Mayor, Thomas R. Ovington, was designed to counteract the activities of radicals and to give an opportunity to the citizens of the community to dedicate their lives anew to the principles of the American Republic.

Under the spreading sycamore trees in Ganesha Park, hundreds of Pomona's people enjoyed a picnic dinner while the municipal band played patriotic music. Then more than 2,000 school children, under the supervision of their teachers, led the community parade which followed the national emblem into the great out-of-door theater—one of the most beautiful and most perfect Greek theaters in the country. Here the school children gave a program of dancing and



THE GREEK THEATER IN POMONA IS AN IDEAL PLACE FOR A COMMUNITY CELEBRATION

music, and they were followed by a speaker who gave a stirring address on the principles of Americanism.

The day was a complete holiday in Pomona. The stores all closed at noon and as many people as possible took part in the patriotic program. America Day is to be an annual event, and as an antidote for radicalism Pomona is recommending her celebration to other communities for May Days which are to come.

This enjoyable celebration has done much to unite the community.

LOWELL C. PRATT.

Real Estate Association Encourages City Planning

The California Real Estate Association has launched a state-wide campaign for the development of an interest and activity in city planning. This campaign is to be conducted with the cooperation of the Extension Division of the University of California, and under the leadership of Dr. Carol Aronovici.

Recently the University of California announced its intention of inaugurating a four-year course in real estate as a part of its regular curriculum. This course is to begin with the next academic year and is to be carried on with the cooperation of the California Real Estate Association. Courses in housing and city planning will then be included in the curriculum.

The city planning movement throughout the state will be carried on under the leadership of a general committee of the Real Estate Association, which will have charge of the work in conjunction with the Extension Division of the University. Mr. James H. L'Hommedieu, of Oakland, is chairman of the state-wide committee. Aside from a portable city planning exhibit

which will be carried to every community of 5,000 population or more, courses of lectures and conferences will be held in each community under the auspices of the real estate boards, and at the end of the course a plan for the pursuit of city planning work in the community will be formulated and left with the local committee.

The Real Estate Association, realizing that their membership extends into 100 cities throughout the state and represents approximately four billion dollars' worth of real estate property, have come to feel that city planning is an integral part of their general work, as they are the real city builders of the state.

Dr. Aronovici started his work on May 12 and opened in San Francisco, where large groups are being organized to meet at regular intervals for the purpose of discussing city planning from the point of view of the local community. In Oakland the city plan devised by Werner Hegemann will be used as a basis in the conference discussions, which promise to have wide influence.

Preparing Permanent Assessment Maps*

Speedy Work and Uniform Scale Make Yonkers, N. Y., Maps Ready for Spring Assessments

By Edward M. Deering
Assistant to City Engineer, Yonkers, N. Y.

THE growing engineering complexities of a city—its sewer system, water system, gas system, steam system, its paving problem—make necessary several independent bureaus or departments to properly carry on the municipal engineering work. Yet all of these departments, together with such others as the board of assessors,

This was the problem which confronted the City Engineer of Yonkers in January, 1920. It was difficult, inasmuch as the city contains about 21 square miles and has a population of about 100,000 persons and it was imperative that the work be completed in the shortest possible time. It was therefore necessary to ascertain what the present



A TYPICAL SHEET OF THE YONKERS ASSESSMENT MAP

the department of taxation, and even the public utility corporations operating in the city, are dependent upon a map of the city as a means of recording their activities and as a basis upon which to work. The efficient coördination of the activities of the various departments requires that they must all work from the same basis, they must be able to use the same language in defining the location of a piece of property—that is, they must have uniform basic maps.

and future requirements were, how other cities were meeting them, and then the best means of completely and economically meeting them within the time allotted for the work.

On May 1, 1921, only 17 months after the work was started, the various departments of the city of Yonkers will have one of the most efficient and economical sets of working maps in the country. As this is information of vital interest to all city engineers, a resumé of the problem and the pro-

* Copyright, 1921.

cedure of its solution is given in the following paragraphs.

Assessment Map Requirements

The following are the principal requirements of a set of city maps to meet the conditions found in the average city:

(1) There must be one master map for use in the preparation of all the basic maps used by the various departments.

(2) The scale of this map must be uniform. It must be sufficiently large to permit of properly indicating small parcels of land, say 25 x 100 feet, yet sufficiently small to reduce the volume of the map to a minimum.

(3) The unit maps must be of a convenient size for both field and office work.

(4) The system of designating parcels of property must be simple and flexible; it must provide for further subdivision into both blocks and lots.

(5) There must be obtained from the master set of maps, for use by the various departments, reproductions which will be economical, true to scale, permanent, and of such a nature that sewer layouts, water-main locations, etc., can be indicated thereon.

(6) The master set of maps should be such that revised maps can be prepared from time to time without undue expense, yet there should be on file a complete record of all changes.

(7) The master set of maps should be protected against loss by wear, fire or theft, yet there should be maps available for further reproduction and current use.

(8) Some means must be found whereby the old set of maps, in many cases drawn at various scales, can be used as a basis of the new set, thus eliminating the costly work of recompiling the entire map.

General Procedure in Preparing Assessment Maps

The above requirements, of course, largely determined the procedure to be followed in Yonkers, although both the advantages and the disadvantages of the practice found in other cities were carefully considered in determining this procedure. Thus, as an example, some cities prepare their official maps on drawing-paper mounted on muslin. This was found to be unsatisfactory for the following reasons:

(1) Copies are not readily available except at high cost, and duplicate copies are usually almost imperative.

(2) The sheets become dirty and worn

through use, and replacement means redrawing and checking the entire map.

(3) The paper, being mounted on cloth, is likely to be distorted through shrinkage; further, the paper pulls away from the muslin with use.

(4) No provision is made for protection against loss through fire, damage, or theft.

Preparation of the Master Maps

Material.—To facilitate the preparation of the master map and to make it possible to economically obtain reproductions, the maps were drawn in India ink on the best quality tracing cloth.

Scale.—It was found after careful trials that a scale of 1 inch to 50 feet was the smallest scale which could be used if small subdivisions were to be indicated.

Size.—The size of 18 x 28½ inches was decided upon for the individual maps. One-half-inch margin was allowed at the top, bottom and right, and a 2-inch binding margin at the left, making the work size 17 x 26 inches. For office use these maps were bound in loose-leaf canvas-back post binders 18 x 27 inches, the sheets being bound at the left. For field use they were bound with the leaves hinged at the center in loose-leaf binders approximately 18 x 15 inches.

Scheme of Parcel Designation on Master Maps

The city was divided into six sections of approximately equal area, the boundaries of which were shown on a wall map of the entire city. A key map 18 x 28½ inches was prepared for each section, on which were shown all streets, together with block numbers assigned to each block. In assigning block numbers consecutively throughout the section, sufficient block numbers should be reserved for undeveloped acreage. The first digit of the block number is also the number of the section. Thus in the second section the block numbers run from 2000 to 2999, although 2650 was the highest block number used in the section. In this way provision is made for assignment of block numbers for all future time. The lots within each block are numbered consecutively, allowing one lot number for each 25 feet. Under the old system wherever an acreage tract went into subdivision it became known on the tax roll as the "Map of 101 lots of M. Estate," "Map of 327 lots at Bryn Mawr," etc. Lot designation now becomes Section 2, Block 2281, Lot No. 37.

This designation is sufficient on tax rolls, where the lot and block system of maps in any municipality or tax district has been approved by the New York State Tax Commission. Each sheet should show on each of the four sides the adjoining sheet numbers, so that ready reference is available in tracing property covering more than one sheet.

Method of Reproduction

The original maps, which were drawn to various scales, were reproduced by the Autoprint process. This is a cheap photographic process by means of which it is possible to obtain at an economical price either enlargements or reductions of maps, the maximum size of the reproductions being 40 x 60 inches. Thus these maps were reproduced so that they were all of a uniform scale of 50 feet to the inch. It was found that the enlargements so made held their scale to the required accuracy. These enlargements, supplemented by filed maps of subdivisions, surveys and deed descriptions, formed the basis for the new maps. As the new maps were prepared on tracing cloth, it was possible to simply retrace most of the detail from the Autoprint enlargements. Much time was also saved by the use of templates in laying out block numbers, page numbers and northpoints, which had the added advantage of securing uniformity in style.

Preparation of the Working Maps

After a survey of the various types of reproductions, it was found that Lithoprint reproductions would answer all the requirements and at the same time make the general use of these maps by the various departments economically possible. For the benefit of those unfamiliar with this method of reproduction, it might be said that by means of this process it is possible to obtain prints of lithographic characteristics (inked prints) at a cost comparable to that of blueprints. The prints are not chemically treated, and thus the maps are all uniformly true to scale, they are permanent (do not fade, crack or become brittle) and, further, prints can be obtained on any material.

To meet the requirements for the various bureaus and departments of the city, county and state, 20 copies of each map were made.

Eighteen of these were on a heavy cloth known as Linaura cloth. This material was selected because of its durability and the ease with which additional information, such as sewer layouts and water layouts, could be added. Two copies were also obtained on tracing cloth. The originals were then filed away in a secure place, and the Lithoprint tracings were used when needed for reference and blue-printing.

General Operation of the System

The maps are, of course, absolutely necessary in the Departments of Assessment, Taxations, Tax Arrears, etc., and their use here is, of course, obvious. As outlined above, the full-size books make an ideal office record, while those folded to half size are sufficiently compact to be used in the field by the assessors. Changes in property divisions are made on the reproduced maps in colored ink, one color for each change. When the changes become confusing on the reproduction, one change is made on the original, and new reproductions are prepared. The old sheet which shows chronologically the record of these changes then becomes a permanent record, while the original, which has not been damaged by this one change, is put back in the file for safe keeping. Each of the other departments, such as Bureau of Sewers, Bureau of Water, Department of Public Works, has a complete set of the maps reproduced on Linaura cloth. These form the base maps upon which are indicated the location and size of sewers by the Bureau of Sewers, the location and size of the water-mains by the Bureau of Water, etc. This information is usually put on in various colored inks for the sake of clarity. When the changes on the map become too confusing, a new reproduction is obtained, and the old map is filed as a permanent record.

A complete map of this nature is, of course, of very great value to real estate companies, insurance companies, gas companies, etc. But its greatest value lies in the fact that there is one and only one official map which is the first and last word in all matters in that city requiring a map for reference or record.

ACKNOWLEDGMENT.—Illustration by courtesy of Lithoprint Company of New York, Inc., New York City.

What Machinery and Technical Developments Have Done for Water-Works

Few Officials Really Appreciate What Modern Appliances Have Done for Water-Works Operation

IT is interesting to consider the changes which have occurred during the present generation in the methods and means of doing the work of a water distributing system. George H. Finneran, Superintendent of the Boston water-works, in an interesting talk before the New England Water Works Association, outlined a number of instances where machinery, mechanical devices, or the application of technical knowledge, has materially improved and speeded up the work necessary in connection with a water distribution system.

The automobile has replaced the horse, and, while it has speeded up matters in the water department, it has brought its own troubles in reckless driving and smashing of hydrants. The tapping machine, with its special sleeves and valves, and the valve inserting machine, have replaced the old method of shutting down the main, cutting out the metal with hammer and chisel and pumping the trench dry.

Electrical thawing has replaced the slow and more tedious method of injecting hot water into the pipes. The motor truck attachment for closing and opening large gate valves has made their operation easy and quick, a big factor in general maintenance and in main-pipe breaks of serious consequence. Electrically operated valves have been developed and successfully installed and operated in many places. Electrically driven pumping units, largely of the centrifugal type, mechanical stokers and mechanically operated valves have made pumping stations more efficient.

The various jointing compounds have to a considerable extent superseded lead, thereby saving bell holes, calking and cost of material. In some parts of the country cement is now being used as a jointing material. Cast iron water pipe is being manufactured and sold with lead joints in the bells ready for calking.

The trenching machine under certain conditions is displacing the pick and shovel. Gasoline and electric power-driven pumps are employed where hand-worked dia-

phragm pumps formerly were used. The air compressor, combined with pneumatic tools, has replaced hand rock drilling and hand calking, to a large extent. The differential hoist with its duplex and triplex blocks is used to advantage in laying main pipe and in displacing the rope tackle and the cumbersome winch.

The leak finder, pipe locator, gate finder, aquaphone, detectaphone, transmit-o-phone, geophone, sonoscope, sonograph, sounding rod, Pitometer, manograph and Venturi meter all tend to facilitate the work of stopping leaks, minimizing waste, increasing revenue, and accurately judging the efficiency of the system.

Plunger piston meters have quite generally given way to the rotary and oscillating disc types with more accuracy, especially in small flows. The compound meter with its wide range of service has made it practicable to meter pipes with considerable variation in the rate of flow. Meter testing has been much facilitated by improved apparatus. The patented flanged couplings, or dry couplings, as they are sometimes called, have to a large extent displaced the plumber and his solder joint.

Electric and acetylene lights have made night work practical. The hand flashlight has replaced the antiquated and dangerous candle and the smoky and smelling lantern. The oxy-acetylene torch is every day proving itself to be a money-saver by its ability to repair broken castings and metal parts that formerly were considered as beyond repair. The plumber's torch has replaced the old charcoal furnace with its soldering irons. Gasoline and kerosene lead-melting furnaces are used where formerly wood and coke supplied the heat. A large blow-torch melts out the lead joint where in the old days a fire of wood or charcoal was built under the pipe.

Steam, slacked lime, charcoal and the blow-torch are now used to remove frost from the ground. Calcium chloride, denatured alcohol, glycerine and kerosene are applied to hydrants as anti-freezing mate-

rials. The natural heat of the ground is intelligently utilized to prevent freezing of meters and hydrants. An improved type of force pump combined with up-to-date methods has made the clearing of stoppages easier and more successful.

The development of the telephone system has facilitated the direction of outside men through means of frequent communication between headquarters and near and distant points. The development of the emergency gang with its light motor truck equipment

has resulted in quick service to the public and in the control of leaks and breaks with a minimum amount of damage. The development of water-works associations with the meetings, interchange of opinions, recital of experiences, collection of data, work of committees, standardizing specifications, the influence of the organizations in promoting beneficial and desirable legislation, etc., have tended in a very great degree to advance the ways and means of operating a water-works system.

Water-Main Excavation in New Bedford, Mass.

Revolving Shovel Equipped for Digging Trenches Used Also for Grading and Street Work Without Alterations

IN 1869 the first municipal water system of New Bedford, Mass., was completed. This system consisted of a reservoir created by damming the Acushnet River, thus creating a storage area of 300 acres. Seventeen miles of pipe, from 4 to 16 inches in size, was laid. The population of New Bedford was at this time 21,000. The original water-supply was outgrown about 1893. It became necessary to seek additional sources of supply, and higher pressures. Larger ponds were acquired and a reservoir was built on a higher location.

In the spring of 1920 further additions were necessary, and considerable main pipe work was contemplated, including an addition to the system of 6,600 feet of 36-inch cast iron water-mains.

It was decided to carry on this work under direction of the municipal engineers. The scarcity of labor caused the officials to investigate some means of digging trenches for water-mains which would be more efficient than hand labor.

After considerable investigation, a 14-B Bucyrus revolving shovel was purchased and delivered in October, 1920. This shovel was equipped with a special sewer dipper and a long dipper handle.

The machine has been at work constantly since October and has excavated trenches



REMOVING A BIG BOULDER FROM THE TRENCH

for 36-inch pipe, 4 feet wide, and averaging 7 feet in depth. In addition to this the machine has excavated 2,000 feet of trench for 6-inch pipe. On this 6-inch pipe trench, 2 feet wide by 7 feet deep, the average was 300 lineal feet per day. The output in digging the 4-foot trench was about 130 lineal feet per day. Trench for over half a mile of 16-inch pipe was also excavated.

The material excavated consisted of hardpan in which were imbedded large boulders. The digging was extremely difficult, and it was necessary to chain out boulders frequently. The shovel handled these easily. No sheeting was used in the trench, as the material was so compact that there was very little danger from cave-ins. The backfilling was done by hand.



A GENERAL VIEW OF THE JOB

Some of the big 36-inch mains can be seen at the right. The A-frame derrick for lowering the pipe into the trench can be seen in the background

In addition to its work in digging trenches, the machine has been used by the Street Department for excavating gravel

and for grading. On this work it has not been found necessary to change the long dipper handle to a standard one, and the shovel is being used for street work equipped as it was for sewer excavation.

During the coming two years it is proposed to lay about $3\frac{1}{2}$ miles of 48-inch water-main connecting the pumping station with the present distributing system. The 14-B Bucyrus shovel will be used for all the necessary excavation.

It was estimated by the owners that between the months of October, 1920, and January, 1921, the shovel had nearly paid for itself in the saving effected over hand methods.

This is an instance of the versatility of steam shovels in municipal work.

ACKNOWLEDGMENT.—Illustrations by courtesy of *The Excavating Engineer*.

Vote for Chlorination and Filtration as a Typhoid Preventive



SOME TAXPAYERS NEED SERIOUS ILLNESS IN THE FAMILY TO SHOW THEM THE NEED OF ADEQUATE PROTECTION OF THE CITY'S WATER-SUPPLY

Roads Well Maintained at Reasonable Cost

1920 Costs of Patrol Maintenance Work in Nebraska Counties

THAYER County, Nebraska, has 39½ miles of patrolled roads on the state highway system, outside of town limits. This number does not include those roads which are maintained by the county only, or those which are a part of the county system. However, the main roads of nearly the entire county have received attention during the past construction season. Of the 39 miles, 25 are a part of the Meridian Highway, which carries very heavy traffic during the summer season. For this reason constant and careful maintenance is essential.

There are two State and Federal Aid

ered rather typical of this particular section of the state. The costs are distributed over 9 months, and 4 of the patrols covered the Meridian Highway. The costs were as follows:

Labor (patrolman's salary)	\$9,818.92
Gas, oils and supplies	120.16
Repairs	61.86
Depreciation on equipment	526.77
	<hr/>
	\$10,527.71

With these figures as a basis, the average cost per mile per season of 9 months amounts to \$266.52, or an average of \$529.61 per mile per month.



AN ELEVATING GRADER AT WORK ON THE GENESEE-BELVIDERE ROAD, NEBRASKA

roads in the country from Belvidere north to the county line. One road from Belvidere north is 5.34 miles long, and is approximately 80 per cent complete, and another, 7.27 miles, from Hebron to Belvidere, is complete. In addition to this improved mileage, 24.22 miles were graded during the past season by heavy gang equipment.

The present system provides a standard graded road throughout nearly the entire length of the county and half-way across the county east. The patrol work has been handled entirely by 6 teams covering the 39 miles, the average patrol section being 6.6 miles. Costs have been completed for the past season's work and may be consid-

Maintenance Cost in Hamilton County

The County Highway Commissioner during 1920 accomplished excellent results at a reasonable cost in maintaining the roads in Hamilton County by team patrols. It is interesting to compare these costs with those in Thayer County, where the same method is used, although the topography varies from a sandy, hilly country on the table-lands to the Platte River bottom-lands. The following costs are for the patrolling of this section:

Labor	\$1,575.00
Gas, oil and supplies (this item is only supplies) .....	.65
Repairs	8.44
Depreciation	51.12
	<hr/>
	\$1,635.21

This figure represents the cost per season of patrolling 6.15 miles, or an average cost of \$266 per mile per season, or \$29.55 per mile per month.

Costs in Pawnee County

Eighteen miles of road in Pawnee County have been patrolled by team, and 20 miles with tractor. On the latter patrol, trucks were used a part of the time. There has been no heavy gang maintenance work in the county, and the State and Federal Aid roads were built by the use of convict labor the past season. A 20-mile stretch was patrolled between Pawnee and Burchard, and the costs of the patrol are interesting, as the tractor was used, and a truck a part of the time:

Salary	\$2,340.00
Gas, oils and supplies	847.43
Repairs	357.70
Depreciation (for truck and tractor)	605.40
	<hr/>
	\$4,150.53

The cost given above for patrolling these 20 miles for 9 months gives an average cost

of \$207.53 per mile per season, or \$23.06 per mile per month.

Otoe County Patrol Work

The county contains some of the heaviest-traveled roads on the Washington Highway, which tourists travel between Omaha and Kansas City, and, in addition, there is heavy traffic from the south into Nebraska City, as the farmers bring considerable stock into the packing-house at Nebraska City. The entire road was constructed by State and Federal Aid funds, and is now completed, approved and paid for. The maintenance has been excellent. Following are the costs for a truck patrol on 19½ miles of road:

Labor	\$2,365.40
Gas, oils and supplies	738.18
Repairs	59.93
Depreciation on equipment (trucks only) ..	248.95
	<hr/>
	\$3,412.46

The sum of \$3,412.46 represents a total cost per season of 9 months to maintain 19½ miles, or an average cost of \$175 per mile per season, or \$19.44 per mile per month.

Municipal Public Health Activities

Many members of the present generation can recall that the services of the municipal health officer were very largely confined to quarantining contagious diseases and to the suppression of obnoxious odors. However, with the concentration of vast numbers of people in our cities and with our rapidly expanding knowledge of the causes of disease, problems of health and sanitation by the score have been forced upon him until his importance in community development has become second to that of no other municipal officer. Perforce he has expanded from being merely a medical man to become also skilled in law, bacteriology, chemistry, engineering and sanitation.

His duties now lead him through all the streets and alleys of the city. They take him to municipal buildings and churches, to theaters, stores, jails and schools. He keeps a watchful eye upon factories, laundries, barber shops and bath-houses. He investigates the keeping and selling of foods and the use of injurious adulterants, dye-stuffs and preservatives. He examines milk and water. He goes far to investigate dairies, and he wades swamps to destroy the anopheles. He looks into ash cans and vaults, and into sewers for rates and other

vermin. He quarantines and combats epidemics and endemics. He keeps morbidity and mortality statistics. His ministrations extend to the city hospitals, bureaus, stations, laboratories, and to cemeteries and crematories. He regulates the actions of physicians and undertakers.

Wherever public sanitation and health are endangered, there is found the health officer to advise and admonish and, when necessary, to enforce his mandates. This field which so largely envelops and guards the lives and industries of men, ever widening and ever growing in the confidence of the people, has well proved its worth. Step by step it has developed upon public sentiment in each city to meet the needs of that city, as surely as any other department has grown to meet the needs at hand. And so it must be that the efficient administration of municipal health functions shall depend upon keeping the health officer close to those whom he serves. That he may receive this necessary sympathetic support, each municipality must build, direct and own its own department, and appoint its own full-time health officer.

The American Journal of Public Health, May, 1921.

The Obligation of the City to Its Citizens

The Need of Fire Prevention Education and How to Put It Across

By Alfred T. Fleming

Superior, Conservation Department, The National Board of Fire Underwriters

THE present unsettled condition of the world of finance, price fluctuation on all commodities, labor unrest, and the great uncertainty of the future, are incentives for the weakening of the moral fiber of our citizenship. Many men are facing great financial loss for which they are not prepared. This is, therefore, a moment of paramount importance, a moment when all forces should be correlated to save our citizens and our created wealth. Carefully tabulated figures, including our fire loss on insured and uninsured buildings, the loss of our forestry through fire, the upkeep of our fire departments, and excess water-supply, amount to over two million dollars per day. If you figure up the economic loss which results from disturbed business, cancelled contracts, loss to workmen, etc., you will find each day will register over two million more. It is our supreme duty to awaken the public, now as never before, that this abnormal leakage may be stopped, 87 per cent of which is due to carelessness.

That the present unsettled condition of the financial world increases the moral hazard, is admitted by all who have been in any way connected with existing conditions. The augmented losses reported from every state in the Union during the past two months of depression, tell their own story. Supremely above financial consideration is the reported list of those who have paid the penalty for our combined carelessness with their lives. During recent weeks hardly a paper has been published which has not recorded the awful tragedy of human lives lost in burning buildings or rendered helpless and made a public charge. The figures of 1919 show 15,219 burned to death and 17,641 injured. Of these, over 82 per cent were mothers, or children under school age. In the survey it was found that over 90 per cent of the fires responsible for casualties could have been avoided. From advance reports received for 1920, it is feared that

over 20,000 persons have paid the toll for our thoughtlessness with their lives.

The Fire Loss Is Met by the Individual Citizen

From a financial standpoint, losses are too frequently underestimated. We speak in terms of insurance losses, instead of the real costs of the carnage. It has always been the thought of the public that the losses were paid by insurance corporations, but in reality every cent is paid from the individual purse. Buy a suit of clothes at the tailor, and you pay in its cost the value of the insurance tax on the goods, accumulated from the beginning. Buy any article, from a baseball glove to an automobile, and you pay the mechanical cost plus the insurance and overhead carriage. If the losses are great, the costs of protection will be correspondingly increased.

A competent authority has stated that over twenty-five million of our people are without permanent homes. He also states that if five million homes could be built in a week, they would not be sufficient to supply the need for housing. While these facts are before us with alarming vividness, we find in the last year we burned over 898 residences for every working day, causing a total loss on those reported of \$57,-466,847. This does not include thousands of losses on which no reports are made because there was no insurance involved. Ninety-two per cent of the losses in homes are due to carelessness, and here also is where the largest part of the casualties take place. From the most recent tabulations, it is found that \$15,444,801 was reported from electrical causes, over 46 per cent of which was caused by the electric iron. Only 4 per cent of our losses from electricity come from original wiring installed according to the National Electrical Code. Improvised and unauthorized extensions made without supervision cause a large part of the balance.

The great need for ordinances which require proper chimney construction, combustible roofs and personal liability is made apparent by the following tabulation:

Defective chimneys, flues, etc.....	\$10,677,857
Exposure	85,062,845
Sparks on roofs.....	8,284,015

Five School Buildings Are Burned for Every Day in the Year

Some of the serious and most neglected of hazards are found in our schools. A recent survey of public schools throughout the country revealed the fact that 85 per cent of these structures, both public and parochial, are in more hazardous condition than was the building at Collinwood, Ohio, before it burned and caused the death of 173 children and 3 teachers. Five school buildings are burned for every day of the year, telling the story of gross carelessness on the part of officials.

Less than one-third of the schools carry insurance. Where is the blame to be placed? The safety of every child is entrusted to the keeping of the boards of education elected to take charge of the whole system. Only about one out of every hundred of these officials so entrusted has ever given a thought to his responsibility for the physical safety of those under his charge. They have failed to shoulder any but financial responsibility. A school board should secure the most competent person available who thoroughly understands construction and house-keeping hazards, and should accompany him on a careful inspection of every building, making whatever changes are found necessary, at the same time advising the teachers, the pupils, and particularly the custodian of the building, where the fire dangers were found. Only recently a president of a board, after claiming that the schools under his jurisdiction were safe, was led to take this plan, and it resulted in the closing of some schools, and the passage of a bond issue of over a million dollars, which money was spent in improvements to fulfill the recommendations of the inspection report. Every member of each board controlling school property must assume the physical as well as the financial responsibility.

High Standards of Fire Prevention

The National Board of Fire Underwriters, with over fifty years of service experience, has placed at the disposal of the citizenship of each state, without commer-

cial consideration, the best engineering force obtainable, for the general regulation of civic conditions necessary to public safety. With the accumulation of years of toil and thought, standards of protection, development and construction have been evolved which are recognized throughout the world.

The Conservation Department recently established by this organization is endeavoring in every way to awaken the public of the business world to the fact that a coördination of their influence alone will raise the standards of fire protection. By the inspections of special hazards, inspection of towns and cities of high loss ratio, and by the establishment of a live fire prevention committee of business men in each municipality, we are hoping to educate the masses to the need of conserving their own products.

The only lasting force which will correct this abnormal leakage is education of our citizenship. This is the only great loss which has not been placed before the public mind and thus met by public sentiment. Every school board should be responsible for the constant teaching of fire prevention in all the schools. Chambers of commerce, civic clubs, women's organizations, ought to foster a proper and continuous campaign throughout their municipalities. A constant and careful inspection of mercantile districts by members of the fire department, with the proper equipment for protection, and the backing of well-enforced ordinances, will supply the only real and lasting remedy. Now is the time to put this educational program into effect in your home city. It is better to supply the remedy while you can. The anguish of sorrow after the fire takes place and you have buried your wife or child as a result, will not pay for your carelessness *now*.

Organize a committee of your best and most active citizens under the leadership of the chamber of commerce or other similar organization. Obtain the support of the municipal government and all civic clubs so that your committee will represent the entire strength of the community. Secure the proper information, so that all may be well informed on the subject. Begin your work on a large scale. Pikers never get any medals. Do not be satisfied until you have made your city a fireless city and have saved the precious lives of those who would other-

wise be sacrificed in the most awful death ever endured.

The following is a tentative plan of organization which has been the foundation of hundreds of municipal committees already formed and rendering real public service:

*Plan of Organization and Particular Work
Outlined for the Conservation and
Fire Prevention Committees of
Different Cities*

1. THE NEED

In order that we may by coöperative means eliminate much of the stupendous loss of property due to carelessness or lack of thought, and also that we may save the lives of the largest percentage of those who are burned or injured by fire, it is exceedingly important that a Conservation and Fire Prevention Committee be appointed in each municipality.

2. THE ORGANIZATION

The organization of the Conservation and Fire Prevention Committee should bring about the coöperation of the city government, the Chamber of Commerce, the local board of insurance agents, the Manufacturers' Association, Credit Men's Association, Safety Council Bankers' Association, Rotary Club, Kiwanis Club, Optimist Club, City Club, women's clubs, Ad Men's Club, Press Club, The Ministerial Association, and all other organizations of standing. It should also include the Scout Master of the Boy Scouts, the Superintendent of Public Schools, and the Fire Chief. Each of these organizations should appoint certain of their members best qualified to carry on and represent their organization on the Fire Prevention Committee. Thus the Committee would represent the political, social, and educational strength of the municipalities.

Those who are conversant with fire losses and particular causes which might be eliminated, and those who understand best the proper ordinances necessary for each city in connection with its fire protection, should be chosen.

3. ORGANIZATION OF COMMITTEE

It is proposed that the Committee organize with a permanent Chairman, an Executive Secretary and a Publicity Secretary.

4. SUB-COMMITTEE

In order to handle the different phases of this extensive subject properly and efficiently, the following working subcommittees are suggested:

Committee on Fire Fighting and Fire Warden's Office

Committee on Laws and Ordinances

Committee on Publicity

Committee on Fire Prevention Work in Schools

Committee on Clean-up and Fire Prevention Weeks

Committee on General Hazards

5. SCOPE OF COMMITTEE WORK

Committee on Fire Fighting and Fire Warden's Office

- a. To investigate conditions that will increase the hazard and reduce the conflagration hazard of the city.
- b. To study the adequacy of present city fire apparatus, water-works, fire alarm system, keeping of proper records, standard hose couplings, and high-pressure fire service.
- c. To establish a Fire Prevention Inspection Division in connection with the Fire Department.

Committee on Laws and Ordinances.

To prepare drafts of bills covering legislation both for state laws and city ordinances on fire prevention and fire protection matters, such as

Building code
Electrical code
Hazardous materials and fluids
Exits, etc.

Note:—There should be the closest coöperation with the other subcommittees, advising this committee as to necessary and desirable laws and ordinances in order to develop and maintain proper conditions.

Committee on Publicity

- a. To prepare newspaper articles.
- b. To prepare posters and advertisements.
- c. To arrange for lectures.
- d. To arrange for stereopticon slides for theaters.
- e. To arrange for four-minute speakers for theaters and clubs during Fire Prevention and Clean-up Weeks.

Committee on Fire Prevention Work in Schools

- a. To arrange for at least one-half hour every two weeks in all schools on fire prevention.
- b. To develop a series of interesting experiments for classes in chemistry, etc., emphasizing fire hazards and methods of protection.
- c. To arrange for preparation of essays on fire prevention subjects.
- d. To see if some public-spirited men will not put up a small sum of money as a prize for the best essay prepared each term or year.

Committee on Clean-up and Fire Prevention Weeks

- a. To arrange for periodical inspections of the business and industrial sections of the city.
- b. To arrange for the use of Home Inspection Blanks through the medium of the schools or the Scouts in order to improve home conditions and to further the broad educational work.
- c. To have a "Self-Inspection Blank" service installed in manufacturing and mercantile plants.
- d. To investigate present methods of collecting rubbish, etc., to minimize the prominent hazard.

- e. To arrange with the Publicity Committee for the proper observance of Clean-up Week in the spring and Fire Prevention Week in the fall.
- f. To arrange for the issuing of proclamations by mayors of cities and the governor of the state, asking for the cooperation of all in the observance of these two weeks.
- g. To arrange for parades of school children, firemen, and police, and similar demonstrations in order to bring forcibly home to the property owner and others the need of bringing about and maintaining safe conditions as regards fire.

Committee on General Hazards

- a. To prepare inspection blanks for use by

property owners and business and industrial organizations. Sample copies may be obtained upon application to Conservation Department, National Board of Fire Underwriters.

- b. To take necessary steps to safeguard life and property during Fourth of July and similar celebrations, including proper restrictions on sale of hazardous fireworks.
- c. To take necessary steps to safeguard large crowds of women and children, such as may be expected during the Christmas and holiday seasons in department stores, etc.
- d. To be ready to aid police and fire departments in investigating suspicious or incendiary fires.

Bituminous Concrete Foundations

IT is interesting to note the summary of advantages of bituminous concrete foundations as given by Hugh W. Skidmore of the Chicago Paving Laboratory, in a paper read before the Illinois Society of Engineers.

Mr. Skidmore summarizes the advantages of bituminous concrete foundation briefly as follows:

(1) Provides homogeneity of mass and positive bond between foundation and wearing surface when bituminous top courses are employed.

(2) Provides uniform contact with the subgrade, thus insuring the benefit structurally of all of the beam strength possessed by the foundation slab, and at the same time makes certain the uniform distribution of load to the subgrade.

(3) Because of the inherent flexibility of the material, the foundation slab will at no time be called upon to act as an arch over weak subgrade areas, therefore the possibility of the foundation's rupturing, as is frequently the case with Portland cement-concrete, will be reduced to a minimum.

(4) Provides freedom from cracks and upheavals.

(5) Insures against the presence of mois-

ture in the foundation structure, thus prolonging the life of the pavement.

(6) May be easily repaired at minimum cost, the surface patch method being applicable except in the case of very serious defects.

(7) Provides decided economies in construction, as it dispenses with the equipment and organization necessary to lay cement-concrete, thus affording the contractor the advantage of exclusive use of that portion of his ordinary equipment and labor organization which in actual operation has heretofore proved to be the most economical and thereby profitable.

(8) Does away with the long period of time required for the curing of the foundation, thus permitting the opening of completed work to traffic immediately and providing a rapidity of turnover to the contractor not possible in the case of rigid foundations.

(9) Permits the use of the same materials, except cement, as are employed in cement-concrete work.

(10) Under similar conditions, using the same aggregate materials, bituminous concrete of equal thickness will be found to be cheaper than cement-concrete at present prices.

Infants a National Asset

The infant of to-day will be the citizen of the future. It behooves us then to give first place to the care and well-being of our nation's greatest asset. Municipal health departments and full-time health officers actively engaged in infant welfare work have done much to reduce infant mortality in the United States, but to maintain the virility of the nation, infant mortality must be greatly lessened from its present stupendous figures.

Methods for Determining Pipe Extension Charges

By Nicholas S. Hill, Jr.

Consulting Engineer, Hill and Ferguson, New York City

WITH the present conception of a public utility, whether publicly or privately owned, it is not fair for utilities to incur a cost which places an unfair burden upon consumers already connected with the system. The extra cost of an extension which does not pay necessarily places an unfair burden upon existing consumers. The reason for this is obvious. The utility is entitled to earn a fair return on the fair value of the property. Every extension which does not pay a fair return, therefore, must of necessity be recouped from the rates earned by the preëxisting plant.

Now, every utility in a growing community is called upon continually to extend its services into new territory. A man may build a house 1,000 or 1,500 feet from existing lines. He makes an application for the extension of a main to give him water service. The total amount which he may pay for water under the rate schedule is a drop in the bucket compared to the total revenue required to pay a fair return on the extension, for this revenue must not only include a fair return on the investment in the extension proper, depreciation on the extension proper, and the cost of maintaining the extension proper, but also that extension's proportion of the expenses of the entire property which may be fairly and reasonably chargeable to that extension. By the last I mean to say that whenever an extension has been made it becomes a part of the entire system and must bear its proportionate share of the costs of the entire system.

Proper Allocation of General Costs to New Extensions

The unfortunate part of the situation is that the accounting systems of a great many utilities are not so framed that it is easy to allocate the general costs on the entire system to a new extension in a definite and accurate way. The problem of ascertaining the fair return on the extension proper, the taxes on the extension proper, and the de-

preciation on the extension proper is simple, but the allocation of a fair proportion of the gross cost on the entire system to the extension proper is not so easy.

I think the greatest stumbling block in connection with the problem of charging for extensions is that there is too great a desire for mathematical accuracy. The problem is not one of ascertaining the proper charge to the last mill. The problem is fairly to allocate costs so that the extension will pay a just and reasonable proportion of the general expenses of the plant. Whether the extension charge is 90 per cent or 110 per cent of what it should be is immaterial, for it is almost impossible to charge precisely 100 per cent of its proportion to the extension; but with almost any system of accounts a reasonable allocation may be made which will make the extension bear a fair proportion of the general expense.

If the rate structure of a utility is properly developed and cost is distributed between fixed or static costs and proportional costs, the problem is not so difficult. As a rule, the proportion of the so-called fixed charges on the property, that is, the proportion of the fair return, taxes and depreciation, on a plant which may properly be allocated to fixed service or static costs, varies between 30 and 50 per cent in an average water-works plant. Similarly, the proportion of operating expenses on the entire plant chargeable to fixed service or static costs varies between 15 and 40 per cent. The total fixed service or static costs, which do not vary in proportion to the amount of service taken, but remain stationary whether service is taken or not, amount to from 20 to 40 per cent of the total cost of service in an average water-works.

Determining the Charges for Pipe Extensions

Boiled down to the simplest form, the charge which must be made for pipe extensions so that a water-works may be rea-

sonably reimbursed for their cost, includes the following:

- a. Fair return, interest, taxes and the cost of maintenance of the extension proper.
- b. The extension's proportion of the gross fixed service or static fixed charges on the entire plant. The proportion of the gross fixed charges of the entire plant chargeable to fixed service or static cost, as previously stated, varies from 30 to 50 per cent of the fair return, taxes and depreciation on the entire plant.
- c. The extension's fair proportion of the fixed service or static operating expenses of the entire plant. The operating expenses chargeable to fixed service or static costs, as previously stated, vary from 15 to 40 per cent of the operating cost of the entire plant.

It is obvious, therefore, that the first step in the determination of the fair charge for a pipe extension is to ascertain the cost per lineal foot of such an extension. Some water-works prefer to use average prices for every extension of the same size and to base their charge per foot of the extension proper on that average cost. That involves some discrimination, because the price of laying pipe varies in different parts of the territory served. In some parts rock excavation may be encountered, in other parts water; in other parts pipe laying may be cheap. It is more satisfying to the public and strikes people as fairer when the applicant is told, "We will make an estimate of the cost of this extension, and, having made such an estimate, we will submit it to you. Your charge will be based on the actual cost of the extension. If when the extension is laid the cost is less than estimated, the charge will be reduced accordingly. If more, we will charge you no more than the estimate." Under such circumstances the thing to do is to make the estimate cover the cost, and that may easily be done so there is no serious loss. On the other hand, the applicant is gratified if the water-works comes back with a notification that there is a reduction in the estimate of the cost of the extension.

Now, having determined the cost of the extension, it is easy to estimate the fair return, taxes and depreciation on it, as well as the maintenance cost.

Static Costs Chargeable to Extension

The second step is to ascertain the fair proportion of the fixed service or static

costs of the entire plant chargeable to the extension. To do this it is necessary first to ascertain the proportion of the total fixed charges and operating expenses of the entire plant which may be properly allocated to fixed service or static costs.

Having done this, the total fixed service or static cost of the entire plant may be reduced to a convenient unit basis, as, for example, so much per foot of main. A charge of so much per foot of main for the extension's share of the gross fixed service or static cost does not take into consideration the size of the main to be extended, and therefore it is more equitable to reduce these costs to the inch-foot basis. By inch-feet in an extension is meant its length multiplied by its diameter. Thus a 6-inch extension, 100 feet long, will have 600 inch-feet.

By dividing the total fixed service or static costs of the entire plant by the number of inch-feet in the distribution system, ascertained by multiplying the length of each size of main in the distribution system in feet by its diameter in inches, the cost per inch-foot of the fixed service or static charges may be determined. Multiplying this cost per inch-foot by the number of inch-feet in the proposed extension fixes its proportion of the total fixed service or static cost. The rule, therefore, for determining the proper charge for an extension may be stated as follows:

1. Ascertain the cost of the extension.
2. Determine the annual cost of the extension, including:
 - a. Fair return on the cost of the extension.
 - b. Taxes on the extension.
 - c. Depreciation on the extension.
 - d. Maintenance on the extension.
3. Take from 20 to 40 per cent of the gross cost of service (gross cost of service equals fair return, taxes, depreciation reserve, and operating expenses) as the proper portion chargeable to fixed service or static costs.
4. Divide the total fixed service or static cost by the number of inch-feet in the distribution system to determine the proper fixed service or static charge per inch-foot of main.
5. Multiply the number of inch-feet in the proposed extension by the fixed service or static charge per inch-foot as determined, to ascertain the fair proportion of fixed service or static costs which should be allocated to the extension.
6. Add the fixed service or static charge for

the extension to the costs chargeable to the extension proper to obtain the total annual cost chargeable to the extension.

Methods of Payment by Consumer

Now comes the question as to how the consumer is going to pay the cost of an extension. In the author's judgment it is better to have a flexible rule by which the individual preference of the applicant or guarantor for the extension may be satisfied. Some prefer to pay a sum sufficient to cover the cost of the extension at the time the extension is made. Others prefer to pay an annual sum equal to the estimated annual charge for the extension, or, in other words, to pay for the extension in installments. Some water-works allow the applicant to pay for the entire cost of the extension; but such a payment does not cover the cost of an extension, as it saves the water-works nothing but the interest on the money which it would have to secure to pay for the extension. If the guarantor is allowed to pay for the cost of the extension, it should be understood in the extension agreement that the difference between the revenue actually received from the extension and the fair annual cost of the extension as determined shall be deducted year by year from his payments until such time as the revenue from the extension is sufficient to pay the annual charges against the extension, and that there will be returned to him only the net balance due him after deducting the total annual payments from his deposit.

A better way to handle a flat payment is to estimate what the total annual charges on the extension will be for a covering period, say ten years, and to require the guarantor to deposit this sum with his extension agreement. In such a case the extension agreement will provide that only the actual differences between revenues from the extension and charges to the extension will be deducted, and any balance remaining at the termination of the extension contract will be refunded to the guarantor.

Another way, as already suggested, is to have the guarantor guarantee the annual revenue required to pay the annual charges for the extension. If this is done, it is necessary for the guarantor to furnish security, so that the water-works may be as-

sured that the annual charges for the extension will be paid. This may be done by requiring the guarantor to file a surety bond, or bond endorsed by reputable citizens of the community as sureties who are satisfactory to the water-works.

As soon as an extension goes into service it usually pays some revenue. Statistics collected by the author on different water systems indicate that a large percentage, possibly 80 or 90 per cent, of all extensions pay the extension charges within ten years. It is undesirable to have long extension agreements, as it increases unnecessarily the number of such agreements outstanding, making unnecessary bookkeeping and unnecessary trouble. Moreover, there is some question as to whether or not a special extension does not within a certain reasonable time, whether it pays or not, become a part of the distribution system, so it is usually a good plan to agree to return the balance due from a cash deposit, or to release the bond under the annual payment plan, at the end of ten years. The water-works will suffer very little loss on this basis, and it removes many causes of complaint against extension charges. In any event, the extension contract should provide that it will be automatically cancelled whenever the revenue received from the extension equals or exceeds the amount required to pay the annual charges on it. In the case of a cash deposit the balance due is returned at the period of cancellation whenever it occurs, and in the case of a guarantee the bond is cancelled in the same way. In that way the extension takes its place as a permanent part of the distribution system as soon as it commences to earn sufficient to carry it and it ceases to be a special extension.

There is one more point that should be touched upon, and that is: What revenues should be deducted from the gross charges above outlined? The methods of charging for services are so different in different water-works at this time that it is almost impossible to make a general rule on this question. No more can be done than to outline the principle involved.

Effect of Income from Hydrant Rental

In the case of many extensions a water-works will be immediately possessed of the income from the hydrants set on the line. If the entire fire service revenue of a water-

works is obtained from hydrant rentals, it would be unfair to deduct the entire revenue from hydrants from the extension charge, as a portion of this charge goes to repay the water-works for the fair return, interest, depreciation and maintenance of the hydrant and its connections.

Where fire service charges are paid on the inch-foot basis, the inch-foot revenue on the extension is a proper deduction. Where the hydrant charge is a nominal one and only sufficient to cover the fair return, depreciation, taxes and maintenance of the hydrant, the hydrant charge should not be deducted. The revenue which a water-works receives from consumers along a line cannot all be treated as a proper deduction from the extension charges. A sufficient amount should be reserved from the water service revenue along the extension to pay for a fair return, depreciation, taxes and maintenance of the meters and service connections as well as the inspection, repairs and renewals of meters, and the reading and billing of meters. This will usually amount to from 40 to 60 per cent of the minimum charge. The rule in relation to water service revenue from consumers along the line should be, therefore, to deduct 40 to 60 per cent of the minimum charge from the water revenue received from each consumer and apply the remainder as a credit to the extension charges.

Conclusion

This outline has been made as brief as possible, but the principles laid down are believed to be right after working out extension agreements in a number of places. Extension agreements must be modified in individual cases to suit special conditions, but if they are properly prepared and if plans are taken to explain to the public just what they mean, there is little or no dissatisfaction and the water-works receives a ma-

terial revenue from special extensions. In one company the revenue from extension contracts amounts to between \$25,000 and \$30,000 a year, and that indicates the amount of discrimination of which a water company may be guilty in making extensions without a specific charge. Were there no extension contracts in the case mentioned, the other consumers on lines already existing would have to carry that \$20,000 or \$30,000 a year.

Sometimes it is difficult for a water-works to decide whether an extension is a special extension or an extension which the company is obliged to make for the purpose of giving adequate service in territory already covered. The tendency, of course, is to secure all of the revenue possible from extensions, but it sometimes happens that the distribution grid is not thoroughly connected up and extensions should be made to give proper circulation. An extension made under these conditions does nothing more or less than perfect the grid to give good service, and when an application comes in for an extension which is necessary to complete proper circulation, no extension charge should be made.

I would urge that in all cases the consumer be given the benefit of the doubt, because I believe in the long run it always pays. Such cases are not frequent. Usually, special extensions are capable of being easily fixed as such, because as a rule such extensions lead away from the existing distribution system for the purpose of supplying an individual consumer who builds on the outskirts of the town. When cases do arise, however, where a consumer builds within the distribution grid on a street where a main has not been laid, it is well to give the consumer the benefit of the doubt.

ACKNOWLEDGMENT.—From a paper read before the New England Water Works Association.

European Civic Tour Postponed

The Civic Tour to Europe recently announced in *THE AMERICAN CITY* has been postponed until the summer of 1922. The unsettled condition of business in this country has led the management to feel that another season will be more feasible both for business and professional men to leave and for the intimate study of sections of Europe now inaccessible.

The Chatham, Ontario, Hydro-Electric System

By George W. Wands

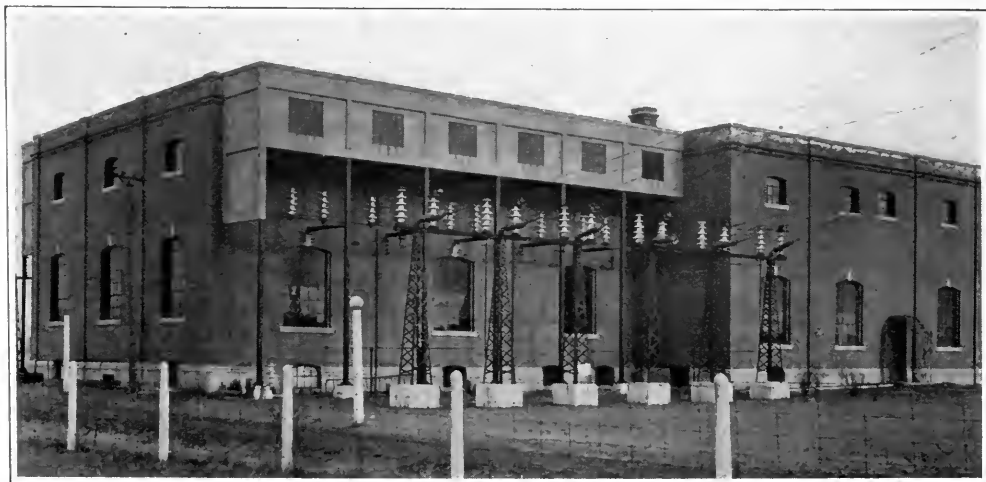
Chairman, Chatham Public Utilities Commission

THE Chatham Hydro-Electric System is a municipally owned public utility supplying street lighting, distributing electric power and light, and engaging in allied activities in the city of Chatham, Ontario. The organization is operated under a commission known as the Public Utilities Commission of the Corporation of the City of Chatham, the members of which are elected alternately for two-year terms, with the exception of the Mayor, who is a member by virtue of his office.

The organization, under the Commission, consists of the manager, who is also the secretary-treasurer of the Commission, and the several departments covering operating, construction, accounting and sales under his charge. The electric power distributed is purchased from the Ontario Hydro-Electric Power Commission, being generated by it at Niagara Falls, Ontario, and transmitted over its lines at 110,000 volts to Chatham, a distance of approximately 180 miles.

Chatham has a population of some 17,000 people, is the center of a very rich and prosperous agricultural district, producing also oil and natural gas in large volume.

The Chatham Hydro-Electric System serves approximately 4,000 consumers of electricity, approximately 95 per cent of all residences and places of business being supplied with electric lighting. The street lighting supplied consists of sixty-nine 1,000-candle-power and eighty-three 750-candle-power nitrogen lamps on ornamental standards in the business section, also some seven hundred 150-candle-power lights, some of which are also mounted on ornamental standards in residence districts. A total of about 3,000 horse-power of electrical energy is supplied to customers, who include, in addition to users of electric light, approximately one hundred factories, mills, machine shops and other users of industrial power. During the almost universal shortage of electric power resulting from recent industrial expansion and the scarcity and high price of coal, the Hydro-Electric System secured as a reserve an existing gas engine plant operating with natural gas fuel to augment its usual power supply, in order that an adequate volume of power should be available at all times to industrial and other consumers in Chatham.



KENT STATION OF THE ONTARIO HYDRO-ELECTRIC POWER COMMISSION 110-000-VOLT
DISTRIBUTING STATION AT CHATHAM, ONTARIO



NIGHT VIEW OF KING STREET, CHATHAM, ONT., WITH ORNAMENTAL LIGHTING SUPPLIED FROM THE MUNICIPAL PLANT

A Wise Business Policy

Largely as a result of this policy of "readiness to serve," the business of the System has been increasing continuously at a substantial rate, and prospective business and inquiries indicate that this progress may be expected to continue. Expansion in the demand for industrial power is resulting from the general recognition of the greater service, efficiency and economy as compared with isolated factory power plants, and also from the increasing application of electricity to industrial processes.

Increasing requirements for electricity for domestic purposes result from the introduction of electric ranges, of which some 300 are now in use in Chatham, also electric washing machines, vacuum cleaners, and other labor-saving devices. In order to facilitate the introduction of these electrical appliances, the Chatham Hydro-Electric System maintains a sales department with showroom and demonstrators. This department also includes the sale of electric supplies and lamps. The extent of the business done is evidenced by the volume of sales, which is at present at the rate of about \$100,000 per year.

Appliances such as vacuum cleaners and washing machines are demonstrated at the home of the purchaser before concluding the sale. A service department is maintained for the benefit of users of electrical appliances, also for the repairing of lights on

consumers' premises. For this purpose a repairman with a light auto-truck is constantly on duty from 8 A. M. until 10 P. M., and all calls from customers are attended to with the greatest possible despatch.

It has been found that electric supply concerns have been more successful as a rule in introducing electrical labor-saving appliances than is the case with merchants or wiring contractors, as the supply concern has a greater incentive to assume the costs of service in view of the increased revenue from the consumption of electric current resulting from the general use of electrical appliances. The Chatham Hydro-Electric System has endeavored to conduct this department of its business, as in the case of all other departments, with the same efficiency as in the case of a private corporation. A wiring and contracting department for the purpose of making industrial installations was formerly maintained, owing to the lack of local electrical contractors in this line. Owing to the encouragement extended by the establishment of a wholesale wiring supply department by the Hydro-Electric System, and the growth of the local demand for such work, a number of high-class contractors are now carrying on this class of work, and the System has dropped all contracting and wiring except in connection with its own installations and minor emergency and trouble work for the convenience of its patrons.

History of the System

The Hydro-Electric System was originally established in the face of local competition after some efforts to purchase the local system had fallen through. The rate charged for electric current in Chatham previous to the installation of the Hydro System was 8 cents net per kilowatt hour for lighting plus meter rent equivalent to a further 2 cents per kilowatt hour (that is, 25 cents per month), and a variable rate running about 4 cents per kilowatt hour for power. Immediately upon the starting of the new service early in 1915, these rates were cut to approximately one-half of those previously in force. Owing to the fact that the basis of charging then put in force is on a sliding scale, the gradually increasing consumption from year to year has resulted in corresponding reductions in the average cost of electric current used since that date. A table is given herewith showing the volume of electric current sold and the average price from year to year up to the present.

NUMBER OF CONSUMERS

	No. of Consumers	Kw. Hrs.	Aver. per Kw. Hr. Each Class	All Current Per Kw. Hour Total Aver.
1916	1,171	177,000	5.7c.	} 3.35c.
(1st full year of operation)	215	174,000	4.2c.	
	25	286,000	1.39c.	
1917				} 2.27c.
Domestic light	1,261	258,000	5.1c.	
Commercial "	265	250,000	4.2c.	
Power	35	1,275,000	1.3c.	
1918				} 1.97c.
Domestic light	1,309	372,000	3.70c.	
Commercial "	265	381,000	3.17c.	
Power	35	2,880,000	1.20c.	
1919				} 1.92c.
Domestic light	1,432	474,300	3.22c.	
Commercial "	280	434,400	2.99c.	
Power	38	2,573,700	1.49c.	
1920	4,000	Total		

This information has not yet been compiled for the year 1920, but will show a greatly increased volume of power delivered at correspondingly low cost per kilowatt hour.

The local System originally paid \$30.78 per h. p. per year for 24-hour power, and this, owing to increased consumption, was reduced to \$29.00 per h. p. per year, the load being determined for each month as the highest 20-minute peak in the month.

The rate charged for domestic lighting is $\frac{3}{4}$ cents per kw. hour, for the first portion of the consumption, and $\frac{1}{4}$ cents per kw. hour for the balance. The amount charged at $\frac{3}{4}$ cents per kw. hour varies from 30 kw. hours up to 90 kw. hours, depending on the rating of the service. A service charge varying from 30 cents to 90 cents per month, is also made. A prompt payment discount of 10 per cent is given.

The commercial rate is 7 cents per kw. hour, for the first 30 hours' use in a month, $\frac{3}{4}$ cents per kw. hour, for the next 70 hours' use, and 7/10 cents per kw. hour, for the balance of current used in the month.

Power is charged for on a basis of \$1.00 per h. p. per month, plus 3.2 cents per kw. hour, for the first 50 hours' use in the month, 2.1 cents per kw. hour for the next 50 hours' use, and 15/100 cents per kw. hour for the balance of current used, and averages about \$2.50 per h. p. per month. The rate for street lighting includes all charges for up-keep in addition to the cost of actual current used.

Street lamps are charged for on the basis of \$12 per year for each 150-candle-power light on overhead brackets, and \$30 and \$38 per year respectively, for 750-c.p. and 1,000-c. p. ornamental standards. These latter, however, do not include the excess capital charges for ornamental standards, as this cost was met by the abutting property owners.

It is a curious fact that notwithstanding the competition, the private company, which was very securely entrenched, owing to a supply of natural gas at a very low cost and also owing to its very able and aggressive management, did not apparently experience any reduction in the volume of its sales; in fact, an actual increase appears to have resulted (although at a lower price) from the competition. While the Hydro System secured a great many consumers formerly supplied by the private company, the great volume of its business came from the sales to those who were formerly not supplied or not fully supplied with electric service, and resulted from the vigorous sales and wiring campaign carried on over a period of years. The result has been that Chatham has now as many consumers of electricity as many cities of twice its size, and the class of users is so diversified that substantially the same volume of electricity is used during the daytime for industrial power and other purposes as is used at night for lighting, etc., so that the equipment and distributing system is kept fully employed at all times.

It should be noted that early in 1920 arrangements were completed to purchase the electrical interests of the Chatham Gas Company, the competing concern, and the work of amalgamation of the two systems was carried out during the year by the Commission's own staff. This work has necessitated extending the substation and storerooms and the changing over to the Hydro lines of some 1,800 electric services and the removal and salvaging, so far as possible, of old wires and poles, as well as transformers, meters and other equipment. The actual transfer to the Hydro lines of this new business took some six weeks' time, but the removal of old poles and disposal of the material has taken considerably longer.

The initial investment in the Chatham Hydro-Electric System was \$90,000, cov-

ered by a sale of 30-year serial debentures of the city of Chatham bearing interest at 6 per cent, the prevailing rate at that time, and commanding a slight premium. Two issues of \$45,000 each of 20-year debentures at 5½ per cent, and one of \$90,000 at 6 per cent for 30 years, have been made since, a total capital of \$270,000, the last in connection with the taking over of the competing system, the two previous issues having been rendered necessary by the gradual expansion of the System.

The full amount of all interest charges and retirement of principal have been paid each year out of earnings, and in addition a depreciation reserve has been set aside sufficient to replace the entire investment in twenty years. This is done in addition to all necessary up-keep of plant, so that an actual surplus will be created when the debentures have been retired, which, as indicated, is also done out of earnings.

A statement of the annual earnings is given herewith, and it will be seen that in addition to meeting all the charges indicated, a net surplus has resulted, which in recent years has reached substantial proportions. It is of especial interest that notwithstanding the general increase in costs and the fact that the equivalent of an 8-hour day was established two years ago for the System's workmen, no increase over the rates announced at the end of 1914 has been made, and, in fact, owing to the sliding scale of charges, actually less money has been received per unit of electricity sold. This has been possible only because of the

increased volume of business resulting from an intensive development of the field.

ANNUAL EARNINGS AND OPERATING COSTS

	Total Revenue from Electric Current Sold	Oper. Costs and Fixed Charges (incl. Dep.)	Surplus or Deficit over All Charges
1915, (partial operation only) ..	16,454.41	17,175.88	721.47 Def.
1916	34,914.46	34,312.80	601.66 Sur.
1917	53,710.95	53,591.14	119.81
1918	73,282.47	71,965.82	1,316.65
1919	81,201.67	76,732.63	4,469.04
1920	142,000.00	132,000.00	12,000.00

NOTE.—1920 figures are approximate, as the annual financial statement has not yet been submitted.

During the period indicated, somewhat more than \$20,000 of debentures have been paid off and a further \$25,000 has been set aside for depreciation, both of these sums forming part of the operating costs.

It may be of interest in passing that in keeping with its policy the Commission authorized the Manager, J. G. Jackson, to proceed with a scheme for the electric smelting of scrap steel produced as waste by local industries, with the object of utilizing unsold power available between the hours of 10 o'clock at night and 7 A. M., during which period it has not been found possible to induce local users to take up the full supply of power available. This installation is now under way.

The Public Utilities Commission has been fortunate in the selection of members. The original Commission elected in 1914-1915-1916 consisted of, in addition to the Mayor, R. L. Brackin, lawyer and present member of the Legislature, and A. D. Chaplin, a manufacturer. Following that date the office has been held by B. L. Bedford and George W. Wands, who has been chairman for the last two years.

Lack of Protection of Water-Supply

SALEM, OHIO, a town of about 10,000 inhabitants, some years ago saved \$15,000 by installing tile pipe instead of iron pipe in the water-works system. Early in November, 1920, this tile water pipe broke, permitting sewage to enter the main and causing a severe typhoid fever epidemic during the latter part of November and throughout December. There were 850 cases of typhoid fever and 50 deaths. Chlorination was resorted to immediately upon the discovery of the cause of contamination and the epidemic checked. The economic loss from the typhoid fever epidemic,

according to the *Journal of the American Medical Association*, has been estimated at \$450,000, calculated as follows:

State emergency appropriation	\$5,000
Red Cross allowance	50,000
Municipal appropriation	15,000
Medical expenses (\$50 for each of 850 patients)	42,500
Private nursing expenses (200 cases at \$100 each)	20,000
Loss of time by wage-earners (one-third of patients at \$5 a day for six weeks)	60,000
Funeral expenses (50 deaths at \$150 each) ..	7,500
Value of lives lost on basis of \$4,000 for each one	200,000
Business losses due to lowered earning power and to avoidance of city by persons from outside	50,000
Total	\$450,000

A System of Accident Records for Police Departments

By John W. Burke

Mayor, Mechanicsville, N. Y.

THE Committee of Public Safety of the New York State Conference of Mayors and Other City Officials has prepared a model system for police departments to use in reporting, recording and summarizing accidents. This proposed system is based on the Committee's study of the blank forms used by the police departments of the principal cities of the United States. It is suitable for reporting and recording all kinds of accidents, and can be used by police departments of either large or small cities, no matter what their organization may be.

In preparing this model system the Committee endeavored to carry out three principles: (1) to make the system simple by having it consist of the smallest possible number of forms for use in the field and in the office; (2) to reduce to a minimum the work of the patrolman while in the field or office by providing forms which require a minimum of writing; and (3) to make the system comprehensive so that no important details of an accident can be overlooked, and so that the office records will contain all necessary data for intelligent studies of causes of accidents and effects of traffic regulations.

The system consists of only four blank forms, namely, a patrolman's field card, an office record, a daily summary of accidents, and a monthly and accumulative yearly summary of accidents and their causes.

A number of the Patrolman's Field cards are carried by each officer while on duty,

When an accident occurs in the territory under his jurisdiction, the patrolman fills out one of these blank forms while making his investigation. The card is very simple. It calls for only absolutely necessary information which the patrolman cannot remember until he returns to headquarters or his precinct station.

The Office Record

As soon as a patrolman returns to head-

**ANSWER EVERY QUESTION. STRIKE OUT IRRELEVANT MATTER.
(IF MORE THAN TWO VEHICLES, USE EXTRA CARD)**

(Vehicle No. 1)			(Vehicle No. 2)		
Registration Number.....			Registration Number.....		
Driver's Name and Address		License Number	Driver's Name and Address		License Number
Owner's Name and Address			Owner's Name and Address		
License Number			License Number		
Driven by — Owner, Family, Employee, Other:			Driven by — Owner, Family, Employee, Other:		
Sex..... Age..... No Driver.....			Sex..... Age..... No Driver.....		
Violation of Traffic Law or Regulations			Violation of Traffic Law or Regulations		
Vehicle—Street	Car No.....	Train	Vehicle—Street	Car No.....	Train
Heavy Truck	Taxicab	Bus	Heavy Truck	Taxicab	Bus
Light Truck	Carriage	Cab	Light Truck	Carriage	Cab
Private Auto	Wagon	Jitney	Private Auto	Wagon	Jitney
Motorcycle	Bicycle		Motorcycle	Bicycle	
Emergency	Delivery		Emergency	Delivery	
Saddle Horse	Auto		Saddle Horse	Auto	
Power — Electricity, Gasolene, Steam, Horse, Foot or Hand, Other:			Power — Electricity, Gasoline, Steam, Horse, Foot or Hand, Other:		
Defects of Vehicle — Steering Gear, Brakes, Lights out, (Front, Rear) Glaring Head Lights, Other:			Defects of Vehicle — Steering Gear, Brakes, Lights out, (Front, Rear) Glaring Head Lights, Other:		
Skidding?	Yes	No	Skidding?	Yes	No
Was Vehicle Equipped with Tire Chains?	Yes	No	Was Vehicle Equipped with Tire Chains?	Yes	No
Fault or Incapacity of Driver — Intoxicated, Ill, Crippled, Deaf, Other:			Fault or Incapacity of Driver — Intoxicated, Ill, Crippled, Deaf, Other:		
Damage to Vehicles or to Other Property					
Weather—Clear, Foggy, Raining, Snowing, High Wind					
Street Conditions—Slippery, Wet, (Raining, Sprinkled) Snow, Ice, Street Lights Out, Poorly Lighted, Excavation, Obstruction, Encroachment, Hole, How guarded?.....					
Pavement or Sidewalk—Kind Condition Broken? Yes No					
Was the officer who makes this report a witness of the Accident? Yes No			Broken Pavement or Sidewalk was reported Yes No By whom?		
Was a traffic man on post at the time of Accident? Yes No			Date		
Other Data					
(Signed)					
Rank.....			Shield No.....		
Precinct No.....					

ONE SIDE OF THE PATROLMAN'S FIELD CARD

quarters or to his precinct station, or completes his investigation of an accident, he, with the aid of his field card, fills out one of the office records, which are kept either at the precinct station or at headquarters. When filled out, this office record should contain a complete history of the accident. By arranging the card so that the information can be given either by striking out extraneous matter or by checking, the Committee has reduced to a minimum the amount of writing by the patrolman. After this office record has been filled out, the field card is attached, and the two are sent to

The monthly and accumulative yearly summary forms are kept at the place where the office records are permanently filed. Each monthly report is compiled from the information on the office record and the previous monthly report. At the end of each month this report is sent to the head of the department for his study and for permanent filing. Arrangements can be made, if necessary, for duplicate or triplicate forms. The report for December will also be the report for the year and a statement of comparison with the record for the previous year.

PRECINCT No.	TIME AND DATE OF OCCURRENCE	PLACE OF OCCURRENCE			
	A. M. P. M.				
TOTAL NUMBER of persons killed.....injured.....(If more than three, use extra cards for their names, etc.)					
Name of Person Killed or Injured		Address		Age	Sex
(1) _____		_____		_____	_____
(2) _____		_____		_____	_____
(3) _____		_____		_____	_____
Fault or Incapacity of Injured Persons:		<input type="checkbox"/> Intoxicated; <input type="checkbox"/> Ill; <input type="checkbox"/> Crippled; <input type="checkbox"/> Blind; <input type="checkbox"/> Deaf;			
<input type="checkbox"/> Crossed Street not at crossing; <input type="checkbox"/> Stealing ride; <input type="checkbox"/> Careless;					
If under 16, was Child going to or from School?		Yes No		In Front of School? Yes No	
Name of Witness		Address		GENERAL LOCATION	
_____		_____		<input type="checkbox"/> Congested District	
_____		_____		<input type="checkbox"/> Intersection of Streets	
_____		_____		<input type="checkbox"/> Crossing	
_____		_____		<input type="checkbox"/> Protected by stanchions	
_____		_____		<input type="checkbox"/> Safety zone	
_____		_____		<input type="checkbox"/> Car stops unprotected	
_____		_____		<input type="checkbox"/> On one-way street	
_____		_____		<input type="checkbox"/> Street, other than above	
_____		_____		<input type="checkbox"/> Bridge	
_____		_____		<input type="checkbox"/> Sidewalk	
_____		_____		<input type="checkbox"/> Traffic post	
Cause of Accident		OTHER THAN ABOVE			
_____		_____			
Accident reported by _____		Address _____			

OTHER SIDE OF PATROLMAN'S FIELD CARD. THE FORMS ARE EASILY FILLED OUT AND GIVE ALL ESSENTIAL DETAILS

headquarters or to any other place decided upon for permanently filing the records of all accidents. The accompanying reproductions show both sides of this office record.

The blanks for the daily summary of accidents are kept either at precinct stations or at headquarters. One of these is filled out each day from the field cards and the office records and placed on the desk of the head of the department. If more than one official should have this daily summary, arrangements can be made for duplicate or triplicate blank forms. This daily summary will keep the proper officials informed about the number and the increases or decreases of different kinds of accidents.

It is believed that with such a system of reporting and recording accidents, a police department will have available complete and accurate data with which to make comprehensive studies of accidents and their causes and of traffic conditions, and will thereby be able to make or recommend needed changes in regulations. It will also be able to provide without delay or any extra labor answers to important questions about accidents and regulations.

Specimens of these various blanks may be obtained by writing to William P. Capes, Secretary of the New York State Conference of Mayors and Other City Officials, at Albany, N. Y.

Painted Traffic Markings on Streets

By Robert H. Whitten

Advisor, Cleveland City Plan Commission

AMONG the numerous devices for the more orderly handling of traffic in congested sections is that of painting white lines on the roadway to mark crosswalks for pedestrians, safety zones for street car passengers, parking spaces for automobiles, and restricted routes or regulations for vehicular traffic. These roadway markings have been applied extensively in Cleveland through the initiative of Inspector May, Chief of the Traffic Bureau of the Police Department.

In some congested sections the pedestrian is the most serious hindrance to a comparatively free movement of vehicular traffic. The jaywalking propensities of the pedestrian are hard to curb. In Cleveland, pedestrians are forbidden to cross the street in the congested district except at a crosswalk. This regulation, while logical and needed, is difficult and perhaps impossible of strict enforcement. The marking out of the crosswalks serves, nevertheless, as a reminder to any but the confirmed jaywalker, and tends to confine much of the pedestrian movement to the prescribed areas. It also serves to remind the autoist to use special caution in passing a crosswalk thus marked.

The roadway markings may sometimes be used to mark the center of the roadway to separate the traffic moving in opposite directions. Where there is a centrally located double-track car line, the tracks indicate clearly the center of the roadway. It is noticeable that upon such streets few drivers will venture to the left of this center line unless they have a clear road ahead. On a street without car tracks, however, and consequently without a definite marking for the center of the roadway, very little attention is paid to the general traffic rule that a driver shall keep to the right of the center of the roadway.

In Cleveland a traffic line has been drawn along the center line of the roadway on the Detroit-Superior High Level Bridge. The traffic here is very heavy, and the marking of the center line has doubtless prevented a great many serious accidents. The center line marking is not usually applicable where a roadway will accommodate an odd number, say three lines of moving vehicles—one

in the one direction and two in the other. Here a central marker reduces the capacity of the roadway from three to two lines of moving vehicles.

Facilitating the Left-Hand Turn

In the case of a heavy traffic street without car tracks it is desirable to have a center line marking near all major intersections. The marking should start at the street line of the cross-street and run back about 200 feet from such line. This will prevent many collisions between vehicles making the left-hand turn. It requires all traffic to keep to the right of the center line of the roadway on approaching a major intersection, and requires all vehicles making the left-hand turn into the street to enter at the right of the center of the roadway.

Another use of the traffic marking is to separate the several lines of vehicles moving in the same direction. This serves to increase the traffic capacity by preventing a vehicle from straddling the space that should be allotted to two lines of moving vehicles. It also facilitates the segregation of fast- and slow-moving traffic. Where on a heavy traffic street there are double car tracks, a safety zone on the near side of the street, and just space between the safety zone and the curb for two lines of moving vehicles to pass, a marking to separate these two lines of vehicles will in very many cases result in speeding up traffic at the intersection by keeping two lines of vehicles moving in each direction instead of the one line in each direction which would be the normal situation without the traffic marking.

Another use of the traffic marking near important intersections is to separate the vehicles proposing to make the right-hand turn at the intersection from those that desire to go straight through. In Cleveland, on the Detroit-Superior High Level Bridge, at least 50 per cent of the traffic moving across the bridge in a westerly direction turns to the right over Bulkley Boulevard at the end of the bridge. A traffic marking several hundred feet in length directs drivers desiring to make this turn to keep near to the right-hand curb.

Motor Trucks in Public Service



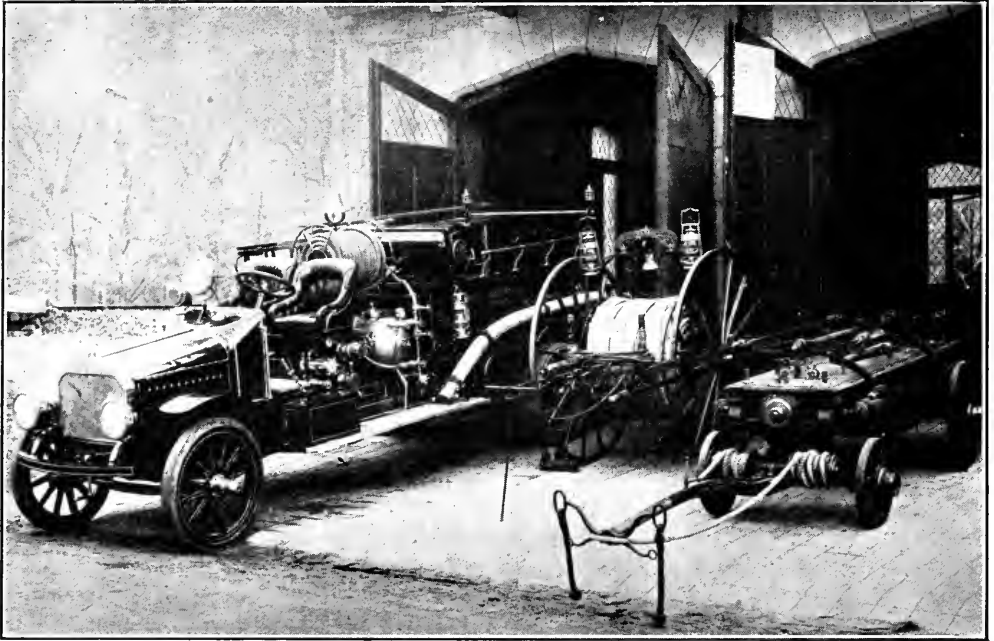
A NOVEL USE OF A MOTOR PUMPER WHICH SAVED THE CITY'S WATER-SUPPLY

The above photograph shows an FWD fire truck at Clintonville, Wis., pumping water for that city's supply into a tower, shown in the distance, which is 164 feet above the pumping station and approximately one mile away from it. During a recent electrical storm the motors used at the pumping station in that city were burned out, and, in the emergency, the fire truck was called upon to replace the burned-out pumps. The truck, equipped with a 500-gallon pumper, was located near the city's well and the intake nozzle lowered into the water. The water was pumped through two lines of hose which were connected to the pipe lines inside the pumping station.



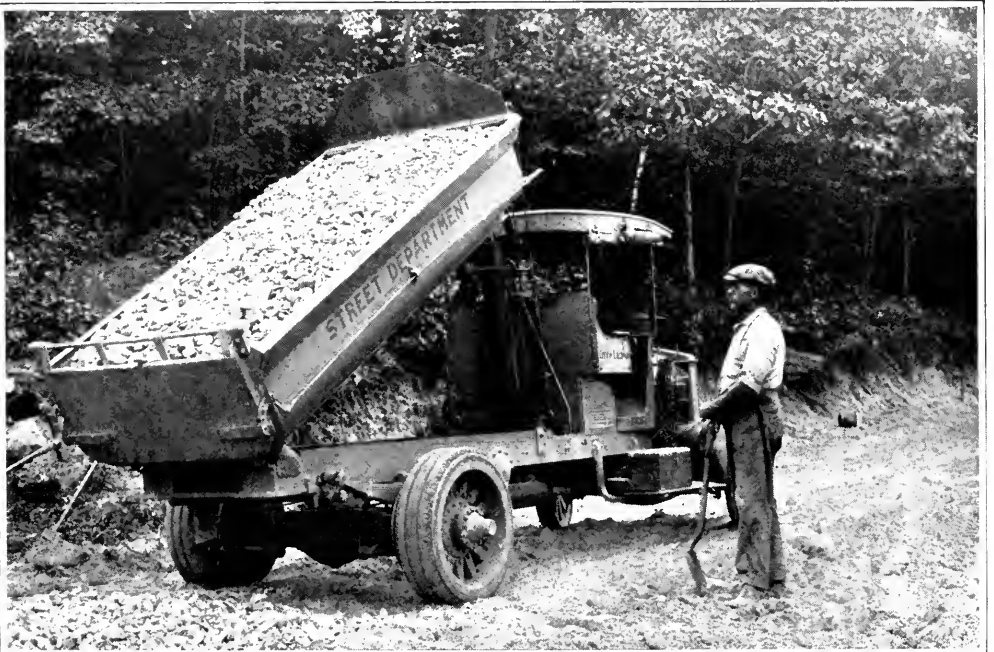
A FEW MONTHS AGO THIS 85-FOOT AMERICAN-LA FRANCE AERIAL TRUCK WAS DELIVERED TO THE SAVANNAH, GA., FIRE DEPARTMENT

The photograph illustrates how the aerial ladder enabled the firemen to easily pour two powerful streams from the ladder into the blaze on the third floor



AN EXAMPLE OF THE PROGRESS OF FIRE-FIGHTING EQUIPMENT IN 75 YEARS

The old hand-pumping engine and hose cart, acquired by the village of Yantic, town of Norwich, Conn., in 1847, shows the stage of development which fire apparatus had reached at that time. Forty men could pump a 1-inch stream of 180 gallons a minute to a height of 125 feet with the old engine. The 1921 product, a Mack triple combination pumping engine, chemical and hose car, needs only one operator and throws a 1-inch stream of 300 gallons a minute to a height of approximately 160 feet



A FEDERAL TRUCK OWNED BY THE STREET DEPARTMENT, LACONIA, N. H., EQUIPPED WITH PNEUMATIC HOIST AND DUMPING BODY FOR HANDLING GRAVEL AND CRUSHED STONE

The Use of Meter Boxes

By William W. Stockly

Civil Engineer, Hancock, Mich.

AN increasing number of communities are considering the desirability of installing meters. Those communities which are troubled with avoidable water waste and wish to reduce the cost of meter maintenance to a minimum, will find great savings effected by the use of meter boxes set either at the curb or over the water-mains where this is possible.

There are many reasons for the use of meter boxes, particularly in northern portions of the country. It has been proved by long experience in those parts of the country affected by frost, that meters do not freeze in properly equipped and installed meter boxes. Furthermore, the meters are always more easily accessible for reading and cleaning, and for removal should that be necessary. The meter box is always "at home" and does not make the meter reader wait for admittance, nor does it require a second or possibly a third call at the premises to get the meter reading. The objectionable and questionable practice of house inspection for the purpose of ascertaining whether the department is receiving full pay for all water furnished, is entirely avoided where meter boxes are installed. Artificial lights, particularly matches and kerosene lanterns with their possible danger to property, are not required in order to read the meters. Also, meters placed in boxes do not get covered with coal, wood, ashes or rubbish, nor is the meter reader required to wear a miner's suit and hard-hat to reach some of the meters.

Tampering by unauthorized persons is made both difficult and risky, and the boxes prevent stealing water through by-passes. They prevent a very large percentage of the

so-called "unaccounted water waste" and put the responsibility for loss of water occasioned by bad service pipes where it belongs. A leak in any service pipe can be easily and quickly determined by closing the principal valve in the basement and then observing the meter dial for a short time. The cost of meter locks, seals, etc., is eliminated.

As a factor in reducing cost, the general installation of meter boxes saves nearly half the time usually required to read meters. Additional expense is saved where it is possible to set the meter box to accommodate both the meter and the street valve. The digging required for either box is practically the same. The cost of meter installation is reduced to a minimum, as all the sets of pipe fittings for the same size and type of meter are identical and can be obtained in quantities and quickly assembled.

If it is desirable to issue bills at the end of the period occurring at mid-winter, the boxes can be readily located from reference points and the snow quickly removed from the covers. In places where snow is packed hard, a charge can be made equal to that of the preceding period, and any difference in actual cost can be adjusted when the spring reading is made.

Meter boxes may be made of concrete, molded in suitable forms, or vitrified sewer pipe may be used. The latter, however, requires considerable cutting to make it fit all depths. The covers of these boxes should be of iron and fitted with good lock bolts. The writer has thoroughly tested various types of covers and is convinced that meter boxes are practical, convenient and thoroughly economical.

Serving Safe Water in Michigan

Municipal "surface water" supplies—drawn from rivers and lakes—serve 58.2 per cent of the population of Michigan, while water pumped from deep and shallow wells, designated as "ground water," is furnished to 17.5 per cent of the citizens. Exactly 50 per cent of the population, 1,833,611 people, now have drinking water that

is chemically treated to render it safe, while 341,881, or 9.3 per cent, are supplied with filtered water. Upon the completion of contemplated filter plants, and filter plants now building, an additional 1,322,880 people—33 per cent of the population of the state of Michigan—will be drinking filtered water.

Chamber of ***** Commerce Activities in Public Affairs

Providing Conveniences for Tourists

SIoux CITY, IOWA.—This is the center of several nationally known highways which radiate out in all directions from the city. Over these highways come thousands of tourists annually from the Pacific Coast towards the east and from the Atlantic Coast towards the west, headed to all parts of the country. A great many of these tourists do not care to stop at hotels, but prefer to camp in some quiet spot away from the noise and dirt of the city and yet with the conveniences of home. With the growth and expansion of industries in the larger cities, tourists are forgotten, and many large cities do not provide for their comfort. But Sioux City has for a long time considered this class and, bearing them in mind, has established camp grounds in Stone Park.

The park is a beautiful tract of over 800 acres of wooded land on the Big Sioux River. It is approached from town by an automobile road which follows the high banks of the river and looks across into South Dakota. A number of camps have been established here, scattered over the 800 acres. They are not in groups, but far enough apart so as not to conflict with one another. These sites are on elevated ground, well drained, and protected by trees. At each camp is a good, substantial stove for cooking purposes, built of brick with a concrete foundation and a 4-foot chimney which affords a good draft and assures a fire in all kinds of weather. The top is covered with sheet iron

which can be removed for roasting direct. A door in the front opens for the purpose of setting the fire and cleaning out the ashes. Adequate fuel in the way of dead limbs and logs is to be found within a few hundred feet of any stove. The stoves have met with the approval of the tourists and not only serve for cooking facilities but furnish a method of disposing of the waste paper and trash which accumulate around the camp. The campers are requested to burn all rubbish before leaving, and they are very considerate in complying with this condition. When they find a clean camp they are always willing to leave it in the same condition, and thus this park is kept clean at all times.

Substantial tables and benches are provided. These are portable and not built in the ground as are the stoves, but can be moved from place to place as necessity requires. One of the most important provisions is for water. City water is used, and near each camp is a standard bearing a drinking fountain as well as a faucet for filling containers. Near the entrance is one



"CAMPING OUT" IS MADE EASY FOR TOURISTS AT SIOUX CITY

Prevent the Costly Waste of Rusting Stand Pipes

Protect them with

TROPICAL ELASTIKOTE

RUST soon ruins the finest Stand Pipe if it is not amply protected from the elements.

Tropical Elastikote is the ideal protective coating. It is a special paint that is noted among great industrial plants for its ability to withstand conditions that ordinary paints cannot.

Due to its unusual elasticity it contracts and expands with the surface to which it is applied. It cannot crack. It clings so tightly moisture cannot penetrate it.

We have prepared a simple test that proves conclusively the unusual non-crack feature of Elastikote. May we send it to you FREE.

THE TROPICAL PAINT & OIL CO., CLEVELAND
"The Firm that Serves with what Preserves"

Waterworks Superintendents

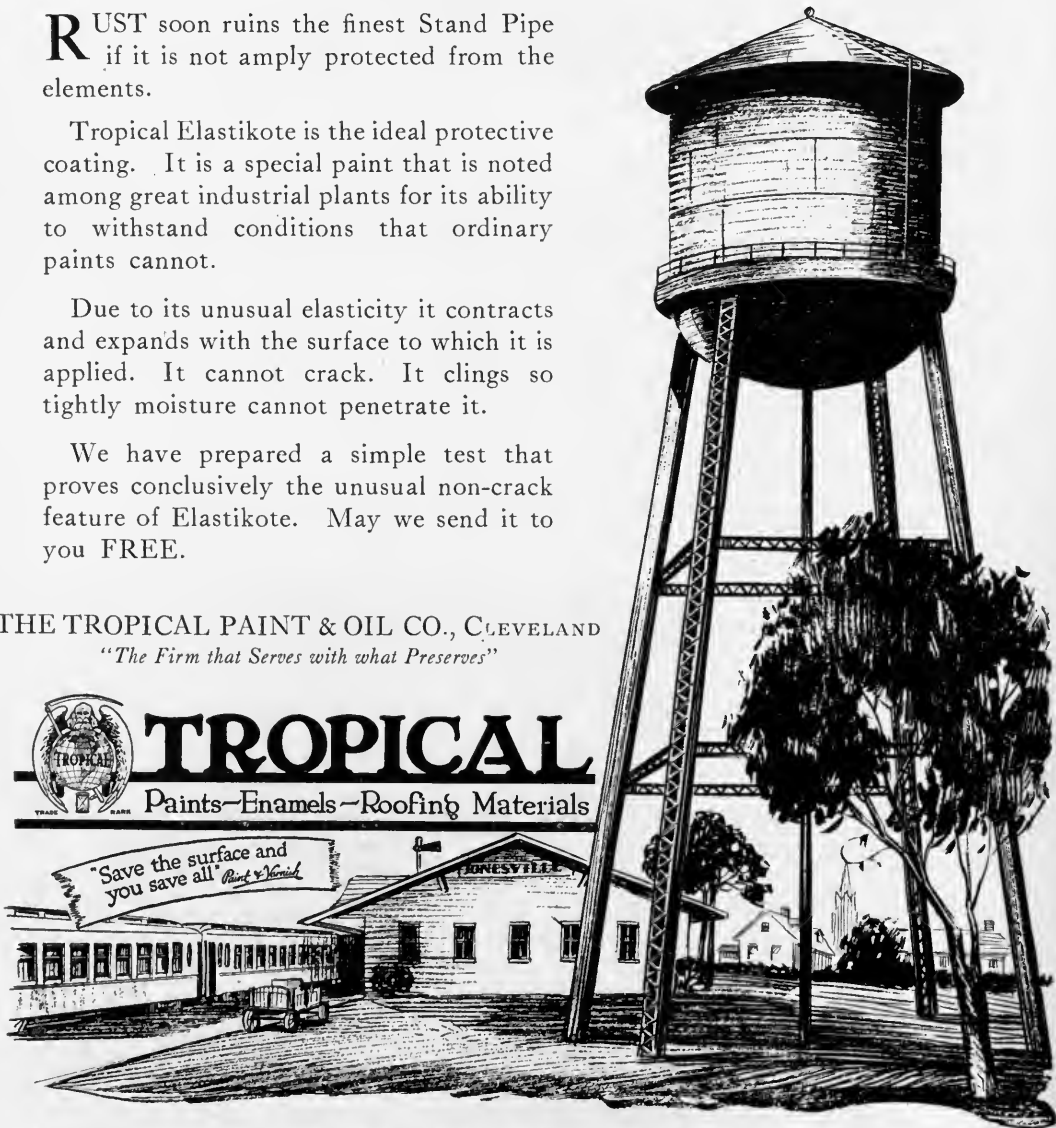
You are cordially invited while at the Cleveland Convention, to make a trip thru our factory and inspect our modern facilities for manufacturing—

ENGINE ENAMELS

FLOORKOTE for cement
floors

TROPILITE for boiler
fronts

Stack and Boiler Paint, etc.



with hose connection for filling radiators; this is an unusual feature and very popular. The roads through the park are well lighted by electric lights during the night, for convenience as well as safety.

The park affords amusements in the form of a zoo and in boating and fishing. A bathing beach is being built and will be in operation this summer. Other forms of amusement are provided from time to time, such as picnics and athletic contests. On all roads coming into Sioux City are large signboards directing motorists to the park. These signs were provided by the Chamber of Commerce, which also maintains a tourist information bureau. Reports are received daily from the more important towns in the surrounding country on the condition of the roads.

The conveniences and the hearty reception which is given to all visitors have made Sioux City a Mecca for tourists.

JOHN D. ADAMS,
Industrial Commissioner, Sioux City, Chamber of Commerce.

Hannibal Chamber Promotes Road Maintenance

HANNIBAL, Mo.—The Hannibal Chamber of Commerce appreciates the need of properly maintaining the earth roads surrounding the city prior to the time when it will be possible to improve them with permanent surfacing.

A plan used by a neighboring town for maintaining dirt roads has proved so successful that it is being adopted in Hannibal. A fund is raised among the business men with which the dragging of the roads is financed. With the automobile traffic constantly increasing, it is out of the question to expect the farmers to drag the roads without compensation. The business men subscribe from \$1 to \$10 a month, and when making the subscription, each man draws and signs a check dated for each month in the ensuing year. The checks are given to the treasurer of the fund, who deposits one on the first of each month. This method saves the expense of collection, and by using the monthly payment plan larger subscriptions are secured.

A committee of three business men makes contracts with the individual farmers for the road-dragging work, for which \$1 per mile is paid. Each farmer is usually given about four miles of road to drag. The farmer is furnished with report cards on

which to record the work done. Whenever he drags his section of the road, he mails a report to the committee, and at the end of the month a check for the amount due is sent to him. By this means a town of 3,000 population has an annual budget of \$1,500 to expend for the work of dragging the main roads leading to the town.

The Hannibal Chamber of Commerce has long realized how great is the benefit of good roads to a community. Marion County was one of the very first counties in the state to employ a competent highway engineer to direct its road-building activities. The County Court's action in employing the engineer was taken only after a long educational campaign had been conducted by the Chamber of Commerce to do away with the old system of having the highways built by road overseers.

More than ten years ago the Hannibal Chamber saw the possibilities for highway improvement and community development in the growing automobile traffic, and organized the first cross-state highway in Missouri, now a part of the National Pike's Peak Ocean-to-Ocean Highway. There are at present twelve marked highways leading into Hannibal, and thousands of tourists visit the city every year, following the marked trails.

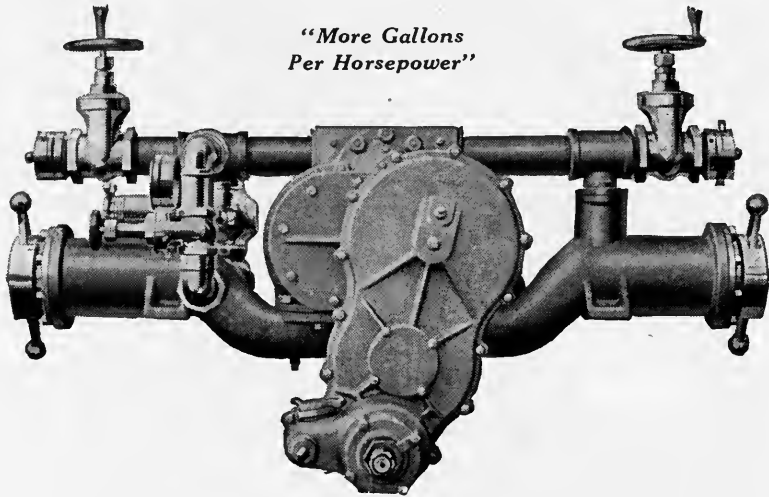
The Hannibal Chamber of Commerce supported Amendment No. 6 to the state constitution authorizing the issue of bonds in the sum of \$60,000,000 with which to build a system of hard-surfaced roads in the state. A very aggressive campaign was carried on in Marion County, in which Hannibal is located, as a result of which the county voted four to one for the bonds, all the other counties in this congressional district giving a majority against the good roads amendment.

H. A. SCHEIDKER,
Secretary, Hannibal Chamber of Commerce.

A Successful Americanization School

FRANKLIN, PA.—Coöperation between the Franklin Board of Trade and the Franklin School Board has made possible an Americanization School here this year. Last year the school was operated without cost, teachers from the local public schools giving their services free of charge. It was felt, however, that this was an unjust burden upon the teachers, and the Board of Trade offered to assist in financing a school with

Northern Rotary Pump



For Any Commercial Chassis

NO PUMP manufactured has exceeded the Northern Rotary in the various competitive tests at which it has appeared. Under varying pressures it will draft more gallons per minute per horsepower than any other.

Northern Rotary Pumps are mounted on any commercial chassis, capacities guaranteed. Not only the pump, but every piece of material in Northern Equipment is made to hold up indefinitely under the severest usage.

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a paid teaching staff. Estimates from the Superintendent of Schools showed that a minimum of \$1,500 would be needed. The School Board offered to supply \$500 for this amount if the Board of Trade would supply the remainder. A quiet campaign among the various industrial plants of the city employing foreign-born labor yielded the necessary funds, and the school has been in successful operation for several months.

Sixty-two pupils have enrolled for the term. Of this number, forty-two are Italians, twelve Poles, and the remaining eight Bulgarian, Serbian, Macedonian, Austrian and Dutch. Four of the students are women, all Polish. Difficulty has been experienced in securing the interest of the women of other nationalities. This problem is being given serious study by those interested in the school, in the hope of discovering some plan whereby the traditional opposition of Southern Europeans to the education of women may be broken down.

No assistance in the financing of the school has been secured from either state or national sources, but the State Commissioner of Public Instruction has promised state aid for the school next year in the event that funds are made available by the Legislature.

The results of the Americanization School work have been very gratifying. Employers report a greater interest in their jobs by employes attending the school. Special attention is given to training the pupils for citizenship, and a number of them have filed their first papers. If sufficient funds are available, it is hoped to increase the registration to 100 or more next session.

L. H. DUNCAN,

Executive Secretary, Franklin Board of Trade.

Opens a Road to Wonderland

CANON CITY, COLO.—Many a community is handicapped in the development of the resources of its environs by lack of funds. Canon City is not unlike other communities in this respect, but its citizens have adopted a way which renders the lack of funds less important.

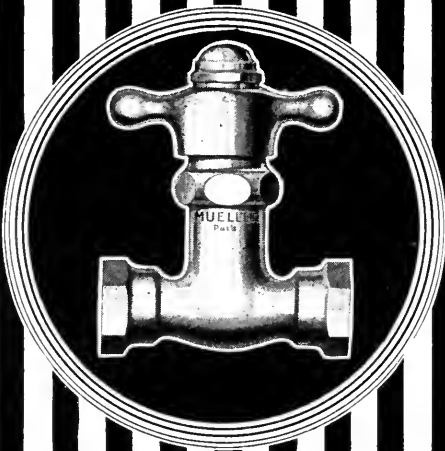
Lying twelve miles to the north of the city is a wonderful undeveloped scenic attraction composed of 600 acres of deep red sandstone canons, cliffs and pillars. On account of its inaccessibility it has lain neglected all these years, although explorations have revealed it as an asset such as few communities possess.



THE KIND OF SCENERY REACHED BY THE
NEW ROAD FROM CANON CITY

It was recently determined to open this remarkable park, and a call for volunteer labor by the Chamber of Commerce resulted in one hundred and fifty business men offering their services for the construction of two miles of mountain road. With the assistance of four teams and a truck this task was completed in three days' time. The road and park were dedicated to the public use on the twelfth of May.

It has long been known that the neighborhood of Canon City was formerly occupied by the Ute Indians, and recent discoveries of old Indian pottery and other relics have added interest to this region.



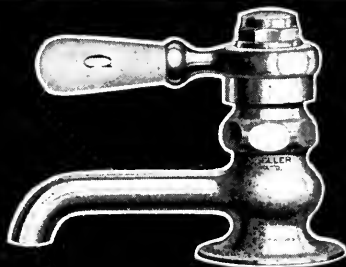
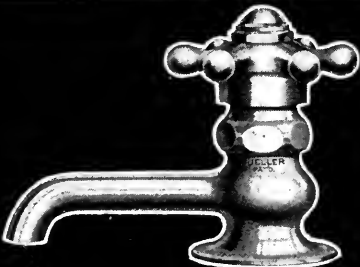
MUELLER Stop Cocks, Sill Cocks and Basin Cocks

Correct designs, the right raw materials and a fine precision in workmanship, make **MUELLER** Brass Goods stand every test, and give dependable and enduring service. In the **MUELLER** line you will find only such goods as you can conscientiously recommend and absolutely depend upon at all times. E-1700, E-1712, E-2005 and E-2010 here shown.

Write for catalog and prices. Mail orders given immediate attention.

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If other localities would absorb some of the spirit shown by the citizens in the construction of this mountain road, many scenic attractions, now neglected, might be developed throughout the country.

E. A. BRADBURY,
Secretary, Chamber of Commerce.

Elmira's Rest Room Proves Popular

ELMIRA, N. Y.—This city is the trading center for a large rural population in southern New York and northern Pennsylvania. A year ago one of the woman members of the Board of Directors of the Chamber of Commerce heard something about rest rooms in other cities and began to agitate the subject of such a room in Elmira for the use and comfort of rural visitors to the city. As a result of her efforts the matter was taken up by the Chamber of Commerce and the Business Men's Association and a general committee was appointed to work out the details of a plan that would make possible a rest room for Elmira.

Through the efforts of the committee an appropriation of \$900 a year was secured from the city of Elmira and the Board of Supervisors of Chemung County, each giving this amount for the operation and upkeep of the room. This gave \$1,800 for annual maintenance. A very desirable location was secured in the retail section of the city, and the President of the Chamber of Commerce signed a lease on it for a period of five years. Two floors, the second and third of the building, are controlled under this lease by the Rest Room Committee. At the present time only the second floor is being used. The Committee secured bids for repairs, installation of plumbing and heating

fixtures, decorating and furnishing, from local dealers. The total cost of these was \$2,400. The Chamber of Commerce paid \$2,000 of this and the Business Men's Association \$400. An interesting fact in connection with the equipping and furnishing of the room is that everyone who supplied any work or material did so at actual cost, so it will be seen that merchants and contractors who were given orders were factors in the installation of this splendid feature of our community service.

On entering the rest room the visitor finds himself in a large and well-appointed room, with comfortable chairs and quiet decorations. If the visitor happens to be a sleepy baby, there are cribs in one of which he can sleep in peace. If it happens to be a tired woman, she can choose a couch on which to rest from the strenuous ordeal of city shopping. Possibly a whole family may drift in with their lunch-basket about noon-time, looking for a place to eat their dinner. For these there is provided a room with tables and gas stoves where coffee may be made and food warmed. This room is used every noon by young women employed in the stores and offices of the city, and here they meet for luncheon and social intercourse. In connection with the rest room there are toilets and lavatories for men and women.

The rest room is in charge of a capable and tactful woman, who is on duty all day long. She attends to the checking of packages and other work of a similar character. Shoppers may direct stores to send their purchases to the rest room, where they are cared for and delivered by the matron in charge. A nominal fee is charged for this service.



THE ELMIRA CHAMBER REGARDS ITS REST ROOM AS A GOOD INVESTMENT

Are you Lighting the Heavens or the Streets?

MOST street lighting today wastes light by permitting it to escape upwards. Lighting up the skies in this way is expensive business.

Turn all the light down on the street—spread it out over the area between lamps—and you get vastly improved lighting at the same or lower cost.

Holophane Scientific Street Lighting will do just this.

It makes streets safer, more cheerful, more useful.

Be sure the equipment you buy has the name Holophane stamped on the glass, showing it is made by the Holophane Glass Company. Genuine Holophane Street-lighting Refractors are of two-piece, dust-proof construction, and control the light by means of scientifically designed prisms. Beware of single-piece imitations that embody mere corrugations, not scientifically calculated prisms.

A lighting engineer will gladly confer with you about improving your street lighting if you will write to the General Electric Co., Schenectady, N. Y., or branches:



the Westinghouse Electric & Mfg. Co. (Geo. Cutter Works), South Bend, Ind., or branches; the Line Material Co., South Milwaukee, Wis.; or

HOLOPHANE GLASS CO.

340 Madison Ave. (Dept. F-22) N. Y. C.

Works, Newark, Ohio

Some idea of the usefulness of the rest room and the service it has already rendered the community may be gathered from the record of registration of visitors: 5,592 visitors registered between May 29, when the room was opened, and the first day of September. This does not begin to show the total number of visitors, for many do not register.

The Elmira Chamber of Commerce believes it was good business to put \$2,000 into the project, and recommends the rest room idea to communities that have large patronage from country people. It is well worth while.

MORRIS JESUP DURYEA,
Secretary, Elmira Chamber of Commerce.

High School Students Taken on Excursion to State University

WATERTOWN, WIS.—The Chamber of Commerce of this city, realizing the value of coöperation between the Chamber of Commerce and the schools, decided that it would be well worth while to take 50 members of the graduating class of the high school to Madison to attend the University's exposition, which consisted of an exhibit of 75 departments of the University of Wisconsin.

In order to finance the undertaking, an appeal was circulated inviting the citizens to go and each to take one student with him as a guest; in case a citizen was unable to go, he was asked to signify how many students he would pay for. Then the graduating class of the High School was invited to take this trip. The day was spent in a most enjoyable and profitable manner, the young people deriving a great deal of benefit from a more intimate acquaintance with the opportunities offered by the University of Wisconsin, and also appreciating this closer association with the commercial life of their town as exemplified by the Chamber of Commerce.

It is believed that while the cost of the trip was small, its educational value was something that cannot be measured by dollars and cents. As a souvenir of the occasion, a photograph of the party was taken on the steps of the State Capitol. This outing was so successful that the Chamber of Commerce now plans to take all the children of Watertown to Madison for a real community picnic on some date in the near future.

MILFORD WITTS,
Secretary, Watertown Chamber of Commerce.



CLOSE ASSOCIATION BETWEEN THE WATERTOWN CHAMBER OF COMMERCE AND THE HIGH SCHOOL IS MUTUALLY ADVANTAGEOUS



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This 128-Page Medart Catalog is recognized everywhere as a text-book on Playground Planning and Installations. It shows in detail just what apparatus is best suited for boys, for girls and for smaller children. It shows ideal playground layouts, where cost is secondary to service and it shows, too, what combinations are most desirable for smaller communities or centers where only a limited appropriation is available.

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Municipal Finance

BONDING

ACCOUNTING

TAXATION

A Unique Solution of the Delinquent-Tax Problem

By D. B. Cassat

Executive Secretary, Dubuque Chamber of Commerce

DUBUQUE, IOWA, is trying a very unusual way of retrieving a city's finances by the organization of a corporation to buy delinquent taxes.

The city-manager form of government was adopted in Dubuque early in 1920. The Commissioners were elected in April, and on June 1 O. E. Carr, formerly of Springfield, Ohio, took office as City Manager. He found a perplexing financial problem. Under the Iowa law for city manager municipalities the limit of indebtedness is $1\frac{1}{4}$ per cent, which reduces the limit in Dubuque to less than \$500,000. On June 1 the city's indebtedness amounted to \$650,000, which, while lower than in most cities the size of Dubuque, was beyond its legal limit.

In addition, the City Manager found a floating debt and current bills unpaid amounting to nearly \$300,000. On the other hand, a careful audit by the State Auditors showed that there was unpaid on the city's books about \$130,000 delinquent taxes and about \$420,000 delinquent special improvement taxes. These taxes had accumulated and gone unpaid largely because there had been in the past five years a lack of buyers at the annual tax sale. The outlook for this year's tax sale was no better than formerly, and, since the city cannot buy in property at the tax sale, there was no way to collect these taxes.

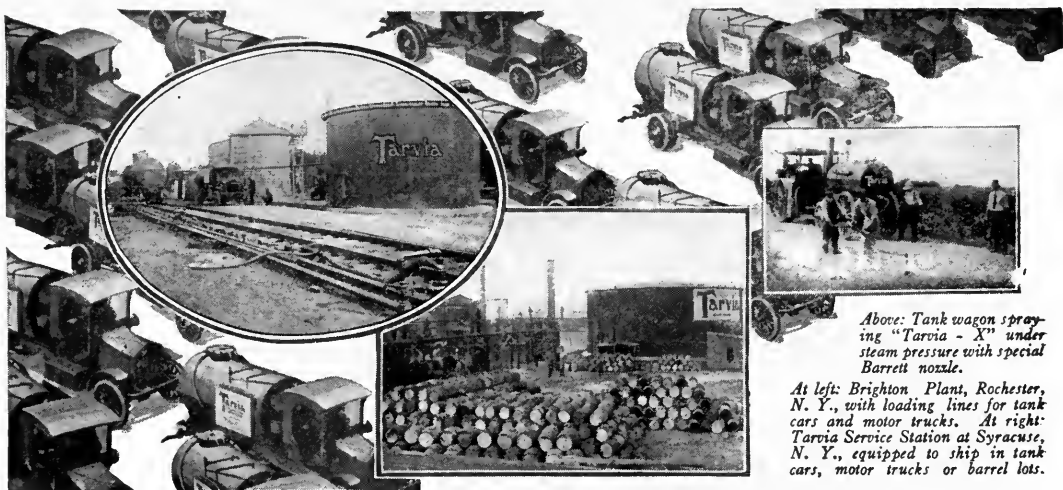
A conference was held at which the City Manager and the Mayor presented their problem to the Chamber of Commerce Board of Trustees. Louis Brede, one of the Commissioners, made the suggestion that a corporation be formed to buy these taxes, not only as a profitable investment but as a

patriotic duty to the city and a safeguard to the good citizens who always pay their taxes. This plan was approved as being the best way to handle the problem. A meeting of all the leading business men was called, and after mature deliberation the meeting went on record as unanimously favoring such a move. The necessary articles of incorporation were drawn up and a stock-selling campaign was started. The articles provide for a corporation of \$300,000, \$100,000 to be subscribed before the corporation can commence business. Three-fourths of this amount has been already pledged, and the success of the project is assured. Never was a more popular move made by a city government and a chamber of commerce to relieve a bad situation. Instead of bearing the stigma that has attached itself to tax-buying in the past, the new corporation is hailed as a patriotic project. Not only the business men but the labor organizations have taken up the matter, and committees of working men are meeting with success in placing stock among their associates.

The success of the organization is already apparent. On the 15th of November, three weeks before the date set for the tax sale, \$135,000 of delinquent taxes had poured into the city's treasury. City officials who had predicted that by November 1 their total year's income would have been depleted, now see their way clear not only to run through the year, but also to retire \$35,000 worth of bonds which fall due in January.

It means the "Pay as you go" plan for the city.

It means a possible reduction in the tax



Above: Tank wagon spraying "Tarvia - X" under steam pressure with special Barrett nozzle.

At left: Brighton Plant, Rochester, N. Y., with loading lines for tank cars and motor trucks. At right: Tarvia Service Station at Syracuse, N. Y., equipped to ship in tank cars, motor trucks or barrel lots.

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CALL on our Special Service Department regarding your road problems or the conditions in your vicinity. We gladly put the skill and experience of our engineers at your disposal. This service is free for the asking. If you are interested in *better roads* and *lower taxes*, here is an organization that can be of real service to you.

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In road work, building or repair, nothing is more important than having material on hand *when* it is wanted. Delays and hold-ups on delivery are expensive. Tarvia Service can be depended upon. Tarvia Service is always "on the job."

Tarvia—Where you want it

Back of Tarvia Service stands the great Barrett organization with its branches, placed all over the U. S. These branches are strategically located to afford efficient

centers of distribution. You can always get Tarvia *where* you want it.

Tarvia—How you want it

Tarvia can be delivered by tank car, motor truck, tank wagon or in barrels. As a rule, Tarvia motor truck service is available within 40 miles of any Barrett Service Station or plant. When the size of the job warrants, motor trucks may be furnished at any distance from the plant or service station, the trucks operating from tank cars placed on sidings.

Motor truck distribution is faster and well worth the slight increase in price necessary to cover the use of the trucks, but equally good results may be obtained with the tank wagon—Barrett nozzle method—as shown in small illustration above.

Simply specify *how* you want Tarvia delivered—we'll do the rest.

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TARVIA is a coal tar preparation made in a number of grades to meet varying road conditions. It is the most popular road material in America and has solved the problem of low cost, traffic-proof roads and pavements for hundreds of towns throughout the country.

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Denver

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Baltimore

levy of 1922.

It means that every citizen will pay his just share of taxes to the maintenance of the city.

There are many problems still to be solved. Many of these special improvement assessments which are delinquent have been found to be unjustly high. These are being adjusted as fast as called to the attention of the City Manager and the Council. Some of the special improvement taxes and some of the personal property taxes may be outlawed. To safeguard all purchasers of tax titles in this respect, the City Council

has passed two ordinances, one of which guarantees to the purchaser that the city will conduct and pay for all litigation in connection therewith, and the other that in any case where assessed valuation is less than the amount paid for the tax certificates by the purchaser the city shall refund the difference.

The corporation does not expect to make a great deal of money, but it does expect to achieve the results enumerated above and at the same time to return to its stockholders an interest rate sufficient to justify the undertaking.

Berkeley, Calif., Votes for Comprehensive Zoning

On April 2 the city of Berkeley took "an advisory vote" on the comprehensive zoning ordinance now in force throughout the city. The result was in favor of the ordinance. The present ordinance was enacted about a year ago, and the advisory vote was taken with the object of testing public opinion on its operation.

The ordinance creates seven zones in Berkeley, namely, one class as residential, four classes of business and public use districts, and two classes of industrial districts.

There are no restrictions as to the height of buildings or area of lot covered, and the ordinance merely classifies the use of property. A number of changes in the zones have taken place on petition of owners, and considerable discussion has arisen over the invasion of residential districts by apartment houses. The latter difficulty has been met by creating single-family residence zones under a previously enacted districting ordinance modelled on the Minneapolis pattern.

On the Calendar of Conventions

JUNE 6-10.—CLEVELAND, OHIO.

American Water Works Association. Annual convention. Secretary, J. M. Diyen, 153 West Seventy-first Street, New York, N. Y.

JUNE 15-16.—WINONA, MINN.

League of Minnesota Municipalities. Annual convention. Secretary, Prof. Richard R. Price, University of Minnesota, Minneapolis, Minn.

JUNE 15-16.—ASHEVILLE, N. C.

Tri-State Water and Light Association of the Carolinas and Georgia. Annual meeting. Secretary, W. F. Stieglitz, Columbia, S. C.

JUNE 15-17.—KALAMAZOO, MICH.

League of Michigan Municipalities. Annual convention. Secretary, Bates K. Lucas, Owosso, Mich.

JUNE 15-17.—BUFFALO, N. Y.

National Association of Comptrollers and Accounting Officers. Annual convention. Secretary, Mark M. Foote, Comptroller's Office, Chicago, Ill.

JUNE 17-18.—PHILADELPHIA, PA.

Pennsylvania Commercial Secretaries' Association. Annual meeting. Secretary, E. J. Fellow, Chamber of Commerce, Lebanon, Pa.

JUNE 20-24.—ASBURY PARK, N. J.

American Society for Testing Materials. Annual meeting. Secretary, C. L. Warwick, 1315 Spruce Street, Philadelphia, Pa.

JUNE 20-27.—SWAMPSCOTT, MASS.

American Library Association. Annual convention. Executive Secretary, Carl H. Milam, 78 East Washington Street, Chicago, Ill.

JUNE 21-22.—WICHITA FALLS, TEX.

League of Texas Municipalities. Annual convention. Secretary, Frank M. Stewart, University of Texas, Austin, Tex.

JUNE 21-24.—SALT LAKE CITY, UTAH.

American Institute of Electrical Engineers. Annual convention and Pacific Coast convention, combined. Secretary, F. L. Hutchinson, 33 West Thirty-ninth Street, New York, N. Y.

JUNE 22-29.—MILWAUKEE, WIS.

National Conference of Social Work. Annual meeting. General Secretary, W. H. Parker, 25 East Ninth Street, Cincinnati, Ohio.

JULY 4-8.—DES MOINES, IOWA.

National Education Association of the United States. Annual meeting. Secretary, J. W. Crabtree, 1400 Massachusetts Avenue, N. W., Washington, D. C.

JULY 19-23.—OAKLAND, CALIF.

American Physical Education Association. Annual convention. Secretary, Dr. J. H. McCurdy, 93 Westford Avenue, Springfield, Mass.

AUGUST 1-8.—PALO ALTO, CALIF.

Western Summer School of Community Leadership. Address, Charles A. Simmons, Western Manager, American City Bureau, Merchants Exchange Building, San Francisco, Calif.

AUGUST 10-12.—CHICAGO, ILL.

International Association of Street Cleaning Officials. Annual conference. Secretary, A. M., Anderson, 1340 Old Colony Building, Chicago, Ill.

AUGUST 15-26.—MADISON, WIS.

Summer School of Community Leadership. Address, Ralph G. Stoddard, Business Manager, American City Bureau, Tribune Building, New York, N. Y.

AUGUST 23-25.—DETROIT, MICH.

American Association of Park Superintendents. Annual meeting. Secretary, Emmet P. Griffin, Superintendent of Parks, East St. Louis, Ill.



He had died a hero—but he had died

"The name of Saunders Harrison will go down on the annals of our school as that of a hero. May you find comfort in the knowledge of the glory of his sacrifice."

It was part of a letter from the head master of St. Matthew's.

The writing blurred before her eyes. Through an aching daze she visualized again that terrible night. Red daggers of flame stabbing the darkness. Great clouds of smoke, that sinister ally of fire, blinding, masking the way to safety. Boys marching out in grim silence. The roll call—each answering to his name, shouting above the sucking roar of fire, and the sickening thuds of falling walls. One boy missing! Her boy, Saunders, went back to get him, and never came out.

Yes, he had died like a hero—but he had died!

His nineteen years of clean, splendid boyhood was a prouder, finer record than many a man's full three score years and ten.

Never to touch him again. Never to hold him tight in her arms.

She rejoiced in his glory. But comfort? He was gone.

* * * * *

Splendid instructors. Athletic sports. Excellent moral

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There is an average of seven school fires every day because safety is "taken for granted."

Will you profit by the terrible experience of others or must you wait for the supreme sacrifice of one of your loved ones before you will see to it that the one sure method of fire prevention is installed?

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GRINNELL
AUTOMATIC SPRINKLER SYSTEM
When the fire starts, the water starts

The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing
Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

In Absence of Express Charter Authority, Municipality Held to Have No Power to Lease Ground for Amusement Park

An interesting decision of the Pennsylvania Supreme Court concerning the right of a municipality to lease grounds to operate an amusement park appears in the record of the case of *Bloomsburg Land Improvement Co. vs. Bloomsburg* (Pennsylvania Municipal Law Reporter, March, 1921; 215 Pennsylvania Reports, 184). It was held in this case that a borough was without power to lease such grounds, because the charter was not broad enough to cover the transaction.

The opinion follows the generally accepted rule that a municipality has no powers excepting those expressly granted by charter, those fairly or necessarily incident to the powers expressly granted, and those indispensable to municipal government. The most pertinent excerpts from the decision are as follows:

"The park was not indispensable. There is nothing in any of the acts of assembly which could imply a power to lease the same; nor is there grant of such power in express words. The people of the town of Bloomsburg had no need of such a place for the purpose of good air, nor for recreation, and the Town Council exceeded its powers when it entered into a contract like that upon which the plaintiff seeks to recover.

"If a town or borough could enter into contracts of this nature upon a theory such as that contended for by the plaintiff, it could easily and quickly ruin the taxpayers by making extravagant and unreasonable contracts with parties like the present plaintiff. * * *

"The interest of the taxpayer must always be one of the controlling features in questions of this kind. Municipal authorities are not always as careful about the rights of those whom they represent as they should be, and it devolves upon the courts to carefully guard the welfare and well-being of the community.

"Counsel for plaintiff has cited a number of authorities to the effect that, the contract having been completed, and the defendant having had the benefit and use of the real estate leased

to it, plaintiff was still entitled to recover, and the defendant could not avail itself of the defense of *ultra vires* [exceeding corporate power]. The majority of the cases cited relate to private corporations, which are held to a much more liberal construction of the power to contract and more strict performance of contracts than municipal corporations, the courts guarding with more zealous care the rights of the taxpayer than the rights of stockholders. * * *

"Besides, there is no particular merit in the claim of the plaintiff, for the reason that it is fair to conclude that it went into this contract with its eyes open, and with every knowledge of what it might expect to occur relative to the position of the town. There was considerable opposition to the execution of this contract. The Town Council was almost equally divided; the Borough Solicitor filed an opinion that the contract was illegal and beyond the powers of the borough officials. All of these things must have been known to the plaintiff company. Notwithstanding this, it decided to take the risk, and if the contract is *ultra vires*, it has no just right or ground of complaint.

"The inhabitants are the incorporators. The officers are only the public agents of the corporation. Their powers and their duties are prescribed by the charter or by statute. All persons dealing with them are bound to know the extent of their power. Any rule or practice which permits municipal officers to transcend their powers is equally contrary to public policy and fraught with such mischievous and injurious effect to the taxpayers of the municipality that it should receive judicial condemnation.' Appeal of Whelen, 108 Pa., 162."

Court Upholds Liability of Municipality to Pay for Benefits Under Void Contract

The Minnesota Supreme Court takes a less harsh attitude toward executed contracts that are void because in violation of statutory requirements than some other courts do. Sustaining judgment in favor of plaintiff against a village, on account of a water-tank and boiler installed under a contract which was void under the Minnesota statutes because let without competitive bidding, the Court says:

"The improvement served a municipal pur-

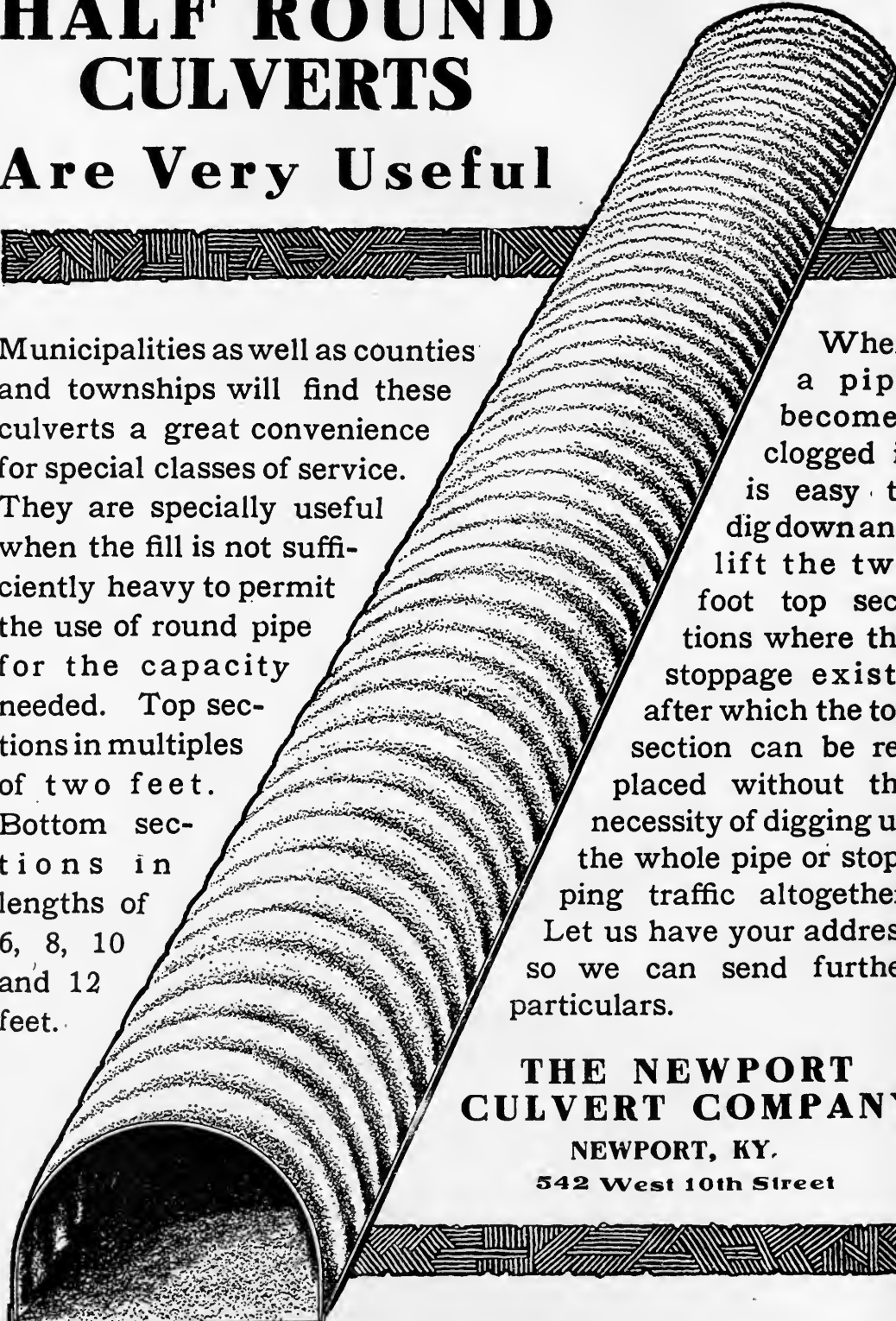
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pose, and the contract was one that the city had power to make, and, had the essential requirements of the law been complied with, the contract would have been enforceable. In such a situation the village may be compelled to pay the value of what it has received. The express contract disappears from the case. The cause of action arises, not from any contract on the subject, but from the general obligation to do justice which binds all persons, natural and artificial." (Fargo Foundry Co. vs. Village of Calloway, 181 Northwestern Reporter, 584.)

Lawyers Not Immune from Occupation Taxation by Municipality

As in the case of other professions or businesses which can be taxed by the state, the state can delegate to a municipality the power to impose a tax for the privilege of following the practice of the profession within the jurisdiction of the municipality. The imposition of an occupational tax by a municipality upon those engaged in the practice of the legal profession is not an interference with state affairs. The mere compliance with certain prerequisites, in return for which a license to practice law is granted by the state, does not place a person beyond the range of additional regulation of the conditions upon which the license may be used. The municipality, in imposing an occupational tax upon attorneys, is not interfering with state regulations, for it is not attempting to prescribe qualifications for attorneys different from or additional to those prescribed by the state. It is merely providing for an increase in its revenue by

imposing a tax upon those who, by pursuing their profession within its limits, are deriving benefits from the advantages especially afforded by the city. (California Supreme Court, *ex parte Galusha*, 195 Pacific Reporter, 406.)

Without Express Statutory Power City Held to Have No Authority to Assess Abutting Property Outside City for Street Improvement

Where a street constitutes a boundary of a municipality given power to improve its streets at the expense of abutting property, the question frequently arises as to whether property abutting upon such boundary street but outside the city limits is subject to assessment. This question was presented recently to the Kentucky Court of Appeals in the case of *City of Ashland vs. Meade*, 224 Southwestern Reporter, 642, and was decided against the city. Holding that before outside property may be assessed under such circumstances there must be a statute clearly authorizing the levy, the Kentucky Court says:

"There is some authority holding that, where the statute in express and unmistakable terms authorizes it, property outside of the city that abuts on a street within the city may be assessed its proportionate cost of the improvement of the street. (Page & Jones on Taxation and Assessment, Sec. 637, p. 1088.) But no authority has been brought to our attention that would authorize the assessment of property outside the city under the provisions of a statute similar to the one here applicable."

It Will Interest You to Know That—

South Australia is the first Australian state to pass a town planning act. This act establishes the Town Planning Department and the office of Government Town Planner on a permanent basis, with immediate control of all new towns and subdivisions. The Central Administrative Board of professional men, proposed by those representing land and building enterprises, was converted into an Advisory Board comprising local government as well as professional members, which will deal with such matters as are referred to it by the State Government.

* * * *

For nearly a year Los Angeles has had a City Planning Commission of 51 members.

Although this involves a considerable amount of clerical work, the large Commission has certain advantages in that it represents a great number of diverse interests. The specialized work of the Commission is in the hands of the following standing committees: Street System, Subdivisions, Railroads, Zoning, Parks and Boulevards, Public Buildings, Legislation, Publicity. The chairmen of these various committees, together with the president of the Commission, constitute the Executive Committee. The personnel of the committees is drawn from the general membership. This results practically in having eight specialized commissions whose work is coördinated through the medium of the Executive Committee and the Secretary-Consultant.



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Municipal and Civic Publications

THE ACTIVATED SLUDGE PROCESS OF SEWAGE TREATMENT

J. Edward Porter, Consulting Chemical Engineer, General Filtration Company, Inc., Rochester, N. Y. 1921. Second Edition. 117 pp. This bibliography of the activated sludge process contains brief abstracts, news items, etc., from current technical literature. This second edition brings the data up to January, 1921, and should prove invaluable to officials and engineers interested in the study of this method of sewage treatment.

THE EMPIRE MUNICIPAL DIRECTORY AND YEAR BOOK—1921-1922

Published by the Proprietors of Municipal Engineering and the Sanitary Record, 8 Brema Buildings, Chancery Lane, London, E.C. 4. 1921. 271 pp. + agenda.

This volume covers the British Empire for the official year April 1, 1921, to March 31, 1922. It contains lists of corporations, county, urban and rural district councils of Great Britain and Ireland and the Overseas Dominions, with names of their clerks, surveyors, health and other executive officers. The special articles on Road Construction and Materials, Engineering and Building Construction, on Lighting, Municipalities and Motors, Sewerage and Sewage Disposal, Public Cleansing and Waste Utilization, Fire Prevention, Public Health, Housing and Town Planning, Sanitation, etc., constitute a review of the progress made during 1920 and furnish a succinct description of approved methods.

THE COMPLETE GARDEN

Albert D. Taylor, M.S.A., non-resident Professor of Landscape Architecture, Ohio State University, assisted by Gordon S. Cooper, B.S.A., member A.S.L.A. Doubleday, Page & Co., Garden City, N. Y. 1921. xxviii + 440 pp. Illustrated.

This book tells what, when, and where to plant under varying conditions of climate, soil, and exposure, in order to get any desired effect. Although intended primarily for gardens and estates, the information is equally applicable to parks; as it gives detailed information covering conditions in all parts of the country. By description, by illustrations, both in color and black and white, by cross-referenced lists, and by a complete index, the information is made readily available.

DRUG CONTROL

"Common Sense in Drug Control," by Paul W. Kearney, formerly Assistant Director, Government House, Department of Public Affairs, New York University. The Civic Press, New York. Reprinted from *The American City* of May, 1921, as No. 202, *The American City Pamphlets*. An account of the modern theory of drug addiction and of the most successful methods employed in combating it. (Apply to The Civic Press, Tribune Building, New York, N. Y.)

LANDSCAPE GARDENING

Andrew Jackson Downing. Tenth Edition, revised by Frank S. Waugh, M.Sc., Professor of Landscape Gardening, Massachusetts Agricultural College. John Wiley & Sons, Inc., New York. 1921. 439 pp. Illustrated.

Mr. Downing was the father of landscape gardening in America, and his views are fully set forth and logically arranged in the present edition. The chapters on "Our Country Villages," "On the Improvement of Country Villages," "Shade Trees in Cities," "Trees in Towns and Villages," "Public Cemeteries and Public Gardens," and "How to Popularize a Taste for Planting" will be found especially applicable to the needs of readers of *The American City*.

HOUSING AND PUBLIC HEALTH

John Robertson, C.M.G., O.B.E., M.D., Medical Officer of Health, Birmingham, Eng. Funk & Wagnalls Company, New York. xi + 159 pp. Diagrams.

A detailed consideration of the influence of bad housing on health, with a discussion of such topics as structural requirements, arrangement of rooms, communal services, reparation of old properties and the building up of new areas. The book is well indexed, and a brief bibliography gives standard works of reference on the subject.

COMMUNITY ACTIVITIES

"The Community Center." A news and discussion organ devoted to community activities, published bi-monthly by the National Community Center Association. It is devoted to the interests of such institutions and agencies as community centers in schools, church houses and community buildings, recreation centers and playgrounds, evening schools and public lectures, rural school centers and consolidation, parent-teacher associations and mothers' clubs, neighborhood and ward improvement associations, community councils and taxpayers' associations, university and normal school extension, and coöperative agencies in country life. (Apply to Clarence A. Perry, Editor, "The Community Center," 130 East 22nd St., New York, N. Y.)

FIRE PREVENTION

Bulletin No. E-5a of the National Fire Protection Association, giving statistics of fire losses occasioned by the use of fireworks in the celebration of Independence Day. (Apply to Franklin H. Wentworth, Secretary National Fire Protection Association, 87 Milk Street, Boston, Mass.)

POLICE PROBLEMS

"The Policing of American Cities," by Raymond B. Fosdick. 3 pp. A brief statement of comparative figures for crime in American and other cities, and an analysis of the defects of American police systems. Published as No. 199 of *The American City Pamphlets*, by The Civic Press, Tribune Building, New York, N. Y. (Apply to publishers.)

The publications listed above are for sale by their publishers. Those in the following list are understood to be free upon application.

SCHOOL CAFETERIAS

"School Cafeterias as a Community Asset," 3 pp. Illustrated. A statement of the need for and value of school cafeterias with practical suggestions for their operation. Published as No. 201 of *The American City Pamphlets*, by The Civic Press, Tribune Building, New York, N. Y. (Apply to publishers.)

SEWAGE

"Proceedings of the Fifth Annual Meeting of the New Jersey Sewage Works Association," held in February, 1920. 38 pp. Contains the papers presented and the discussions. (Apply to the Secretary-Treasurer, Frederick T. Parker, Atlantic City, N. J.)

HOSPITAL AND HEALTH SURVEY

"A Popular Summary of the Cleveland Hospital and Health Survey." Published by the Cleveland Hospital Council. 1920. 26 pp. The pamphlet is a summary,

by sections, of the exhaustive report on health conditions in Cleveland. (Apply to Howell Wright, Secretary, The Cleveland Hospital Council, 308 Anisfield Building, Cleveland, Ohio.)

NEW YORK STATE

State Bulletin No. 2. Published by the New York State Association. 16 pp. Contains the message of Governor Nathan Miller, with an analysis, and other news of legislative activity. (Apply to Mrs. Frances A. Thomas, Assistant Secretary, 305 Broadway, New York, N. Y.)

BIBLIOGRAPHY

"A Short Catalogue of Books on Housing, Town Planning, and the Garden City," to be obtained from the Garden Cities and Town Planning Association, 3 Gray's Inn Place, Gray's Inn, London, W.C. 1. (Apply to the Association.)

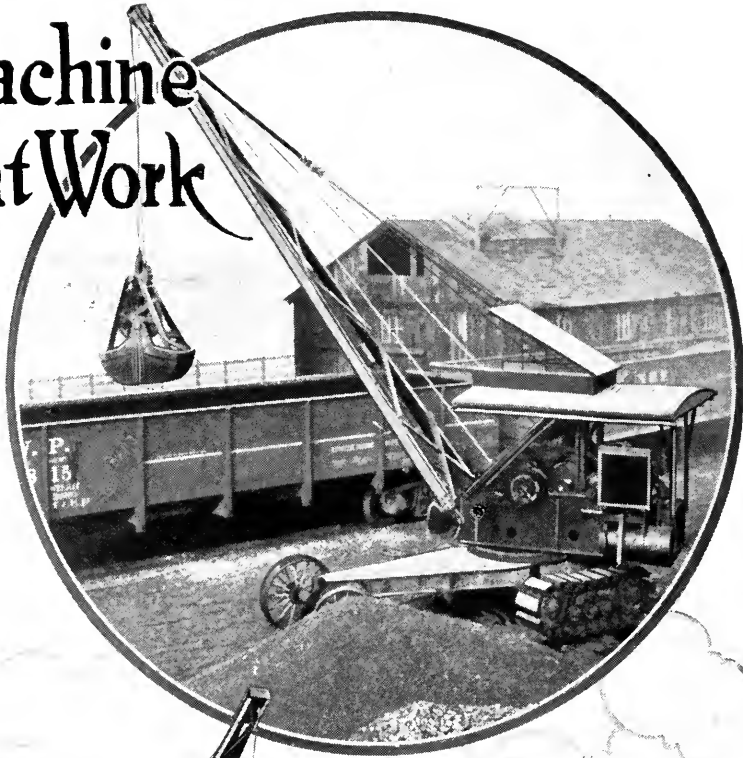
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P&H Excavator-Crane

A COMPILATION OF THE LAWS RELATING TO COUNTIES AND COUNTY OFFICERS

Compiled by S. Edward Hannestad. Issued by the Legislative Reference Bureau, James N. Moore, Director, as Bulletin No. 20, Commonwealth of Pennsylvania. 1920. 761 pp.

One of a series of bulletins prepared by the Legislative Reference Bureau of Pennsylvania with a view to making readily available in compact form the statutory laws of the Commonwealth on particular subjects of general interest to the citizens at large. The work has been thoroughly indexed to facilitate its use for ready reference. (Apply to James N. Moore, Director Legislative Reference Bureau, Harrisburg, Pa.)

SANITATION IN COUNTRY PLACES

"The Theory and Practice of Sanitation in Country Places," by W. Ramsay Smith, M.D., D.Sc., F.R.S. Sixth Edition. 1921. 40 pp. Diagrams and illustrations. The pamphlet, in addition to certain general remarks on rural sanitation, contains a detailed discussion of the bacteriolytic tank system. The author is permanent head of the Department of Health of South Australia. (Apply to author, Adelaide, South Australia.)

CLEAN UP AND PAINT UP

"Clean Up and Paint Up Blue Book." Issued by the National Clean Up and Paint Up Campaign Bureau. 1921. 31 pp. Illustrated. This book contains some account of the campaigns by which more than 7,000 cities and towns have cleaned up and painted up, to render their homes and neighborhoods beautiful, sanitary, and safe from the ravages of disease, fire and deterioration. It contains practical suggestions for conducting similar campaigns. (Apply to The National Clean Up and Paint Up Campaign Bureau, St. Louis, Mo.)

TYPHOID ELIMINATION

"Reducing the Typhoid Toll in West Virginia." An account of five years of sanitary progress. Issued by E. S. Tisdale, Director, Division of Sanitary Engineering, West Virginia State Department of Health. 36 pp. Illustrated. Nineteen different water-borne typhoid outbreaks investigated by the State Division of Sanitary Engineering are briefly described in this bulletin, so that the most common ways in which water-borne typhoid is spread through towns and cities may be illustrated. (Apply to author, Charleston, W. Va.)

LEGAL AID

Two reports: Forty-fifth Annual Report of the President, Treasurer and Attorney of the Legal Aid Society of New York City for the year 1920. 95 pp. Fourth Annual Report of the Volunteer Defenders' Committee of the Legal Aid Society of New York City for the year 1920. 24 pp. (Apply to Leonard McGee, Attorney in Chief, 239 Broadway, New York, N. Y.)

CIVIL SERVICE

Report on a Proposed Classification of Titles and Positions in the Civil Service of the City of Rochester, N. Y. Published by the Rochester Bureau of Municipal Research, Inc. 172 pp. 1920. Covers such subjects as a general statement of principles, a survey of existing conditions, and proposals for classification and standardization. (Apply to the Rochester Bureau of Municipal Research, Inc., Rochester, N. Y.)

NEW YORK FIREMEN'S ASSOCIATION

Proceedings of the 48th Annual Convention of the Firemen's Association of the State of New York. Held at Glens Falls, 1920. 267 pp. (Apply to Thomas Honohan, Secretary, Frankfort, N. Y.)

FIRE PREVENTION.

Two pamphlets: "Regulations of the National Board of Fire Underwriters for the Supervision and Care of Valves Controlling Water Supplies for Fire Protection, as Recommended by the National Fire Protection Association," edition of 1921, 11 pp.; Advance Publication of the Report of the Committee on Signaling Systems—Proposed Regulations for the Installation, Maintenance and Use of Municipal Fire Alarm Systems, 1921, 17 pp. (Apply to the National Fire Protection Association, 87 Milk Street, Boston, Mass.)

STATE HIGHWAYS OF TEXAS

Second Biennial Report of the State Highway Commission of Texas, for the period December 1, 1918, to December 1, 1920. 104 pp. Illustrations and maps. (Apply to R. M. Hubbard, Chairman, Austin, Tex.)

WATER-SUPPLY

"The Facts About Clarksburg's Water Supply," by Scotland G. Highland, General Manager of the Clarksburg Water Board. 2 pp. (Apply to the Clarksburg Federated New Capital Committee, Clarksburg, W. Va.)

USE OF SCHOOL BUILDINGS

"A Twelve-Hour Working Day for School Buildings," Issued as White Paper No. 43 by the Bureau of Municipal Research, 189½ Church Street, Toronto. 4 pp. Proposes a program for 300 days in the year. This is the first of a series of pamphlets on the relations of the school and the community. (Apply to the Bureau, address above.)

IMMIGRATION AND HOUSING IN CALIFORNIA

Annual Report of the Commission of Immigration and Housing of California, for year 1920. 28 pp. (Apply to Paul Scharrenberg, Secretary, Underwood Building, 525 Market Street, San Francisco, Calif.)

TORONTO BUREAU OF MUNICIPAL RESEARCH

Seventh Annual Report of the Toronto Bureau of Municipal Research for the year ending February 28, 1921. 15 pp. (Apply to Horace L. Brittain, Managing Director, 189 Church Street, Toronto, Ont.)

Municipal Reports

Albany, N. Y.—Report of the Bureau of Engineering, Department of Public Works, for the year ending October 31, 1920. (Apply to Frank R. Lanagan, City Engineer.)

Cincinnati, Ohio.—Annual Report of the Department of Street, Sewer and Catch-Basin Cleaning of the Department of Public Ser ice, for the year 1920. (Apply to Fred Maag, Superintendent of Street Cleaning Department, Cincinnati, Ohio.)

Erie, Pa.—Fifty-third Annual Report of the Commissioners of Water-Works, for the year ending December 31, 1919. (Apply to James S. Dunwoody, Superintendent of Water-Works.)

Mayfield, Calif.—Clerk's Annual Report for period between July 1, 1919, and June 30, 1920. (Apply to Sidney M. Cuthbertson, Town Clerk.)

McPherson, Kans.—Seventh Annual Report for the year 1920. (Apply to Ellen Lundstrom, City Clerk, McPherson, Kans.)

Providence, R. I.—Sixth Annual Report of the Water-Supply Board for the year 1920. (Apply to Frank E. Winsor, Chief Engineer, Water-Supply Board.)

Spokane, Wash.—Auditor's Annual Report for the year ending December 31, 1920. (Apply to A. W. Burch, City Auditor, Spokane, Wash.)

Municipal Government at Its Best

To be at its best a government must have the confidence and support of the people at all times. The only way to get this support is through having a continuing interest based on a knowledge of city affairs in general. The successful administration must, in no small measure, be its own propagandist and publicity agent.

—C. E. RIGHTOR.



Cletrac Cuts Road Maintenance Costs

ASOUTHERN city is using this Cletrac for all road maintenance jobs. With one man it is doing more work than the six mules and three drivers formerly used.

Cletrac turns short even when pulling this road grader on a narrow street. Its broad tank-type tracks walk firmly over the worst footing.

The water air washer feeds the carburetor with plenty of clean, moist air. Cletrac doesn't need any "breathing spells." It's busy every minute—handles all drawbar and most belt jobs along the road.

Write direct to us for interesting facts about Cletrac's record on road work and see the Cletrac dealer near you.

THE CLEVELAND TRACTOR CO.

"Largest Producers of Tank-Type Tractors in the World"

19205 Euclid Avenue

Cleveland, Ohio



Methods, Materials and Appliances

News for Boards of Public Works, Engineers, Contractors, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

A Diesel Engine Installation

In 1913 the city of Belleville, Kans., installed a Type A, 170-horse-power Diesel engine which has been in continuous operation since that time. The engine, manufactured by the Busch-Sulzer Bros.-Diesel Engine Company, St. Louis, Mo., has never been rebored and still carries a load readily up to 150 horse-power. In 1916 the city installed a second unit, a Type B 250-horse-power engine, which also has been used continuously. The original plant which was displaced by these engines was a steam plant with oil fire burners, which were used in reserve in connection with the first Diesel unit installed, and until the installation of the second unit. It is interesting to note that the units were paid for in full from the earnings of the plant, and that during the last five years of operation there has been expended from such earnings at least \$30,000 for extensions to the system and the city has a surplus of \$10,000 funds in the water department.

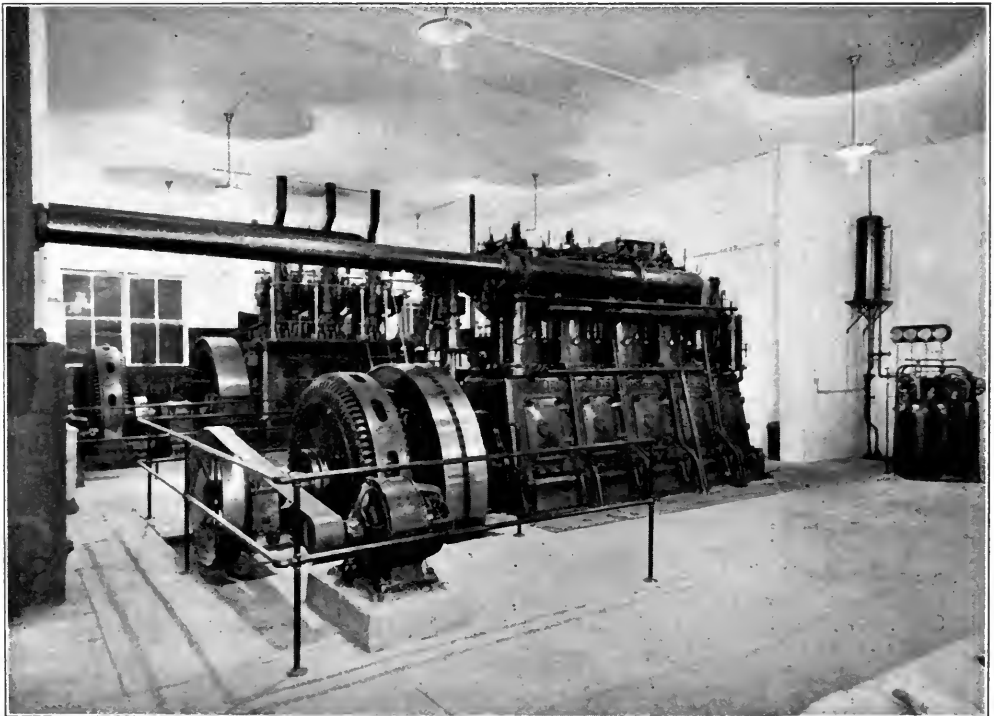
The records of the plant show that in two years the total length of interruptions to service due to engine trouble was only 40 minutes; of the total power generated, 28 per cent was used for pumping and the remainder for the electric department. The cost per kilowatt hour for fuel, lubricants, labor and repairs is 2.05 cents, and the cost to pump 1,000 gallons of water for fuel, lubricants, labor and repairs is 6.78 cents.

Western Pitometer Office

The Pitometer Company, 52 Church Street, New York City, has announced the opening of a Western office in charge of A. E. Skinner, Western Manager, at Room 1402 Monadnock Block, Chicago, Ill.

Extension Service Boxes

One of the chief objections to some types of service or curb boxes is that when frost action



THE POWER-PLANT OF THE BELLEVILLE, KANS., WATER AND LIGHT WORKS



Digging New York Out of the Snow

* * *

The "Caterpillar's" usefulness is not limited to snow removal. For road building, working on farm or ranch, in the mining, oil and lumber industries — wherever power and endurance are at a premium, the "Caterpillar"* has no real competitor*

One night last February, New York City was buried under 12½ inches of snow. But the Department of Street Cleaning was *prepared*. Its fleet of fifty "Caterpillars"*, regularly fitted with 10-ft. snow plows, immediately went into action and battered through the drifts that choked the downtown thoroughfares. They kept traffic open, prevented business losses, and guarded against the peril of fire. Foresight and "Caterpillars"* saved the City many thousands of dollars. The "Caterpillar"* snow removal method is of vital interest to every city and road official. We are glad to show moving pictures of it. Write for further information.

CATERPILLAR
Reg. U.S. Pat. Off.

HOLT
PEORIA, ILL.
STOCKTON, CALIF.

"There is but one "Caterpillar"—Holt builds it"*

THE HOLT MFG. CO., Inc., PEORIA, ILL.

Branch offices and service stations all over the world

Eastern Division: 50 Church St., New York

CATERPILLAR



A SERVICE BOX FOR
YEAR-ROUND USE

occurs, particularly during the spring, the box is heaved, causing a strain on the water line and either a leak or an actual break. The principal feature of the No. 23 service boxes made by the Hays Manufacturing Company, Erie, Pa., is an extension adjustment which permits the box to rise and fall with the frost. With this style box there is claimed to be very little repairing, and when it is necessary to dig up or move a box it can be adjusted very easily without breaking, while with some types of boxes the corrosion will not permit their being adjusted; oftentimes it is necessary to break them in order to get the box apart. The box has an adjustment of one foot. The cover is counter-sunk at the top with an opening on either side to permit water to drain off. It is fitted with a brass plug, making it particularly adaptable to be set in cement walks, as it is not necessary to remove the cover when the stop-cock is to be operated. The extension piece is of 1½-inch pipe, and is held in position by two flat brass springs. The lower end of the pipe is forged to fit in a slot in the base, which prevents it from turning. The base is heavy cast iron and suitable for all sizes of stop-cock, including 1½-inch. The wrought iron rod has an iron washer fitted at the top to hold it central inside of the pipe. It has a heavy malleable iron clamp forged at the bottom, which is fitted with a brass pin to go through the head of the stop-cock. This box can also be used without the rod if preferred.

Stopping Fires When They Start

When a \$2,000,000 fire, then a \$4,000,000 fire, followed by a \$1,000,000 fire, occur within a few days, as happened recently in Worcester, Mass., Athens, Ga., and New Haven, Conn., municipal officials begin to appreciate the need of some means of checking conflagrations where careless property owners permit fires to start. None of the fires mentioned above were conflagrations in the true sense of the word. They were simply spreading fires. The great money loss and the potentiality for greater destruction have, however, caused considerable agitation in other American cities. W. N. Avery, Fire Chief, Worcester, Mass., says:

"The recent conflagration in the business section of Worcester brings more forcibly to my attention than ever before the necessity of adequate fire protection for hazardous buildings, especially those in the business center of a community. There is no question whatsoever in my mind that had automatic sprinklers been installed in the various buildings burned in Worcester, the conflagration would have been prevented.

"We can never have fire-proof cities until all of these cities are, you might say, burned flat and entirely rebuilt. And even if all new buildings were 'fire-proof,' that is no protection to contents. People don't seem to realize that it is contents of buildings more than buildings themselves that cause bad fires.

"The answer, then, is the protection of present property in the most efficient manner, and automatic sprinklers fill that need because they stop fire at its start and do it automatically without any human aid."

The *Grinnell Bulletin*, the interesting house organ of the Grinnell Company, Inc., 283 West Exchange Street, Providence, R. I., states that there are certain very clear and definite advan-



THE SPRINKLER HEAD—THE GUARDIAN
AGAINST CONFLAGRATIONS

tages in meeting the conflagration menace by means of wholesale sprinkler installations. These advantages do not exist in any of the other possible means of meeting this problem:

1. Automatic sprinklers can be installed in practically any building just as it stands.
2. Automatic sprinklers will safeguard both building and contents from fire starting within the structure.
3. Automatic sprinklers will at once reduce insurance rates 40 to 90 per cent wherever they are installed.
4. Each building that is sprinklered reduces by just that much the number of buildings in the congested-value district where conflagration can start.
5. Automatic sprinklers safeguard life as well as property.

Your business is different. Federal gives you the exact truck it demands. Special body styles are developed, correct capacities are recommended. Federal is the right truck, we see that you get the right Federal

In the purchase of a truck, as in the purchase of every commodity, community officials are swayed only by merit. Their choice of Federal in so many cases is, therefore, the tribute of impersonal valuation. This particular Federal serves the Water Works emergency repair department of the City of Los Angeles.

FEDERAL MOTOR TRUCK CO.
34 FEDERAL AVE. DETROIT, MICH.



Another

FEDERAL

One to Seven Ton Capacities

Tracy with Hicks-Parrett Tractor

J. E. Tracy, for the past four years General Sales Manager of the Sterling Motor Truck Company, Milwaukee, Wis., on April 1 became actively connected with the Hicks-Parrett Tractor Company, Chicago Heights, Ill., as Vice-President and Director of Sales. For ten years Mr. Tracy was in charge of the sales of the Milwaukee Corrugating Company, manufacturers of sheet metal building products. When with the Sterling Motor Truck Company, Milwaukee, Wis., he had charge of the United States, Canadian and foreign business.

Motor Lawn Mower

The Jacobsen Manufacturing Company, 1303 Fifteenth Street, Racine, Wis., claims that its 4-acre motor-driven lawn mower is the smallest and most compact simple power motor on the market to-day. This machine weighs only 180 pounds and occupies a space of 18 by 35 inches when not in use. It cuts a swath of grass 24 inches wide and travels by its own power at the rate of 3 to 3½ miles per hour, which gives it a cutting capacity of full 4 acres per day at a fuel cost of less than 40 cents. It accomplishes the work of 4 to 5 men. To operate the machine, a few turns of the starting crank activities the engine; the upward and downward movement of the clutch handle



A POWER MOWER OPERATING OVER GRAVE MOUNDS IN CEMETERY

at the steering handle starts or stops the traction of the mower, and by turning the reel handle located on the left side of the machine, the rotation of the reel also starts and stops. It is simple to walk behind this machine and guide it up and down long stretches of lawn, in and out among bushes, shrubs and trees, paths and flower-beds, leaving no spots untouched to be finished with hand mowers. A miniature differential enclosed in one wheel makes the steering as easy as that of an automobile. The steering handle is built of three strong rods, and can be raised up when the machine is not in use, so as to take up no more floor space than the machine proper.

Motor Truck Cost Data

Some months ago THE AMERICAN CITY offered to its subscribers free copies of the National Standard Truck Cost System. A number of municipalities took advantage of this offer, but as there are still a few copies left, we are glad to continue the offer.

Engineering and Entomology

There have been many people who question the relation or connection between engineering and entomology, so the firm of Gibson & Lewis, Consultants in Engineering and Entomology, composed of Harold M. Lewis, civil engineer, and Edmund H. Gibson, entomologist, Colorado Building, Washington, D. C., have prepared an answer to this question, or to those who doubt, which we reprint herewith, as it contains much interesting information:

"Entomology, or the study of insects, has come into great prominence during the past twenty years, as through its practical application the Panama Canal Zone was made habitable, typhoid fever and many other diseases have been lessened, and malarial as well as yellow fever has been stamped out in certain localities. In most of this work it was the combination of entomological knowledge with engineering practice that brought about such results. Sanitation of towns and communities has been made more complete with the contributions that entomology has given sanitary engineering. During the World War the term "entomological engineer" was coined, and it was through the efforts of such men that various camps were kept free from malaria and other insect diseases and troubles.

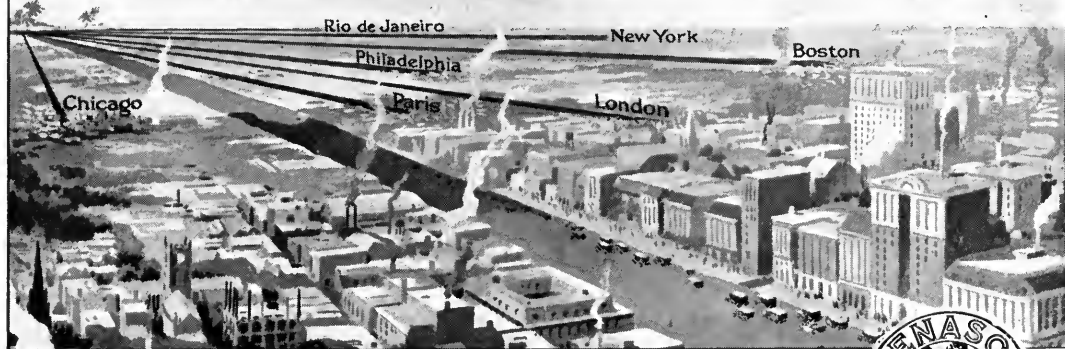
"It has long been recognized that one-tenth of all farm crops are lost each year through the ravages of insect pests, or in dollars and cents more than it costs to maintain our educational system. Entomologists are now aiding the farmer in greater production, and the civil and sanitary engineers are making his home and community life healthy and enjoyable.

"The landscape engineer must turn to the entomologist in the maintenance of the parks and estates which are developed. Beautiful effects produced by the landscape engineer may be seriously impaired if not properly protected from insect attack.

"It is a few of such connections that are most easily pictured which show the relation between

THE AMERICAN CITY

All good streets lead from Trinidad



Why Trinidad Lake Asphalt is the Standard Paving Material of the World

Easily repaired — noiseless — durable — low maintenance — resilient — attractive. These are the reasons why Trinidad Lake Asphalt, for forty-two years, has been used to pave the world's famous streets and highways.

Trinidad Lake Asphalt is a *native* bitumen—a product created by nature and storm-beaten and sun-cured in the tropics for ages. Neither torrid heat nor arctic cold affect its binding and wear-resisting properties.

Native bitumen, or asphalt, has been known to man since the dawn of history. Noah used it to waterproof the ark. In ancient Nineveh and Babylon it was employed as a binder for mosaic pavements and as a cement for brick and stone structures.

The use of native-lake asphalt for street paving was made possible through the discovery of the asphalt lake on the Island of Trinidad—the source of a seeming inexhaustible supply.

Forty-two years of service on streets throughout the world have proved Trinidad Lake Asphalt to be the most durable, stable and economical bituminous paving material known.

Many Trinidad paved streets have resisted traffic and the elements for over thirty years at a maintenance cost of less than a cent per yard per year, a record that no other bituminous material can equal.

Before you pave new streets or repave old ones, write for a copy of

"IT IS DIFFERENT"

Trinidad Lake Asphalt belongs to the famous Genasco Line of asphaltic products. We will gladly send you information regarding any of these products.

THE BARBER ASPHALT PAVING COMPANY

New York
Pittsburgh

St. Louis

PHILADELPHIA
Kansas City

Chicago
Atlanta



GENASCO LINE

Trinidad Lake Asphalt
(For streets and roofs)
Standard Trinidad
Built-Up Roofing
Bermudez Road Asphalt
(For road building)
Genasco Roll Roofing
Genasco Sealbac Shingles
Genasco Latite Shingles
Genasco Vulcanite
Mastic Flooring
Genasco Acid-Proof Paint
Genasco Industrial Paint
Genasco Boiler Paint
Genasco Asphalt Putty
Genasco Asphalt
Pipe Coating
Genasco Asphalt
Fibre Coating
Genasco Tile Cement
Genasco Water-
proofing Asphalt
Genasco Waterproofing
Felts and Fabrics
Genasco Battery
Seal Compound
Genasco Mineral Rubber
Genasco Mineral Spirits
Genasco Base Oils
Genasco Flotation Oils
Genasco Motor Oils
Genasco Soluble Oils
Iroquois Road-building
Machinery

TRINIDAD LAKE ASPHALT

entomology and civil, sanitary and landscape engineering.

"In the past the only agencies that have been able to further applied entomology have been the Federal and state departments of agriculture. Now there is available a private firm which combines the services of the civil and sanitary engineer with those of the entomologist, and it is hoped that the future will see a greater development along all lines of construction and production, to which we trust that we may contribute along with other existing agencies."

Tenney Joins Pease Laboratories

The Pease Laboratories, Inc., 39 West 38th Street, New York City, have recently announced that Dwight Tenney, Chief Engineer of the Franklin Baker Company of New York, and prior to that connected with the engineering staff of the National Biscuit Company, has become associated with them as head of the newly organized Department of Engineering. He will continue his connection with the Baker Company as consulting engineer, having charge



A GROUP OF COMBINATION CONCRETE AND WOOD BENCHES FOR CITY PARKS OR CEMETERIES

Concrete-Wood Benches for Parks

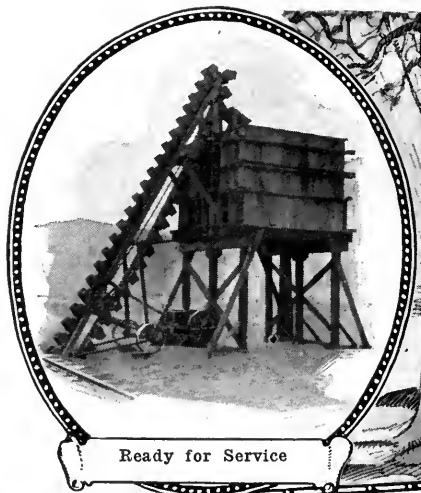
The illustration reproduced herewith shows a very interesting type of park bench which is durable, comfortable and artistic. The concrete ends may be manufactured locally through the use of a patented molding machine made by the Art Concrete Works, Pasadena, Calif. The company leases these machines to local concrete contractors, who are thus able to produce the benches at reasonable cost. This type of bench is used extensively by Pacific Coast municipalities and has proved very satisfactory. The ends being of special design and of machine molded concrete, they have outline features of definitely practical value. The seat and back are made slightly curved of 2- by 4-inch wood.

The Art Concrete Works has recently enlarged its plant to about four times the size of the old plant, and it is now composed of an up-to-date two-story plastered office building with shops and outdoor display room.

of all technical development work. Mr. Tenney's previous experience in plant and machine development in the food industry makes him especially well fitted for his new work.

Engineering Advertisers' Association

The first meeting of the Engineering Advertisers' Association of Chicago, under the presidency of Keith J. Evans, advertising manager of Joseph T. Ryerson & Son, was held on April 12 at the Engineers' Club, Chicago. The speaker of the meeting was H. P. Gillette, who spoke on the subject of "Educational Advertising." The Engineering Advertisers' Association, although only two years old, is growing rapidly and is becoming a large factor in the engineering field. Its active members are advertising and sales managers of nationally known concerns manufacturing engineering products, and its associate membership is composed of one representative each from trade papers in the engineering and allied fields.



Ready for Service



Easily Moved from
One Location to
Another

Unloading Road Materials From Cars By Hand Wastes Taxpayers' Money

Quickly Assembled and Dismantled

THE Fairfield Portable Unloading Machine for unloading sand, gravel, slag, cinders, crushed stone, etc., from hopper-bottom cars makes an appreciable reduction in road construction costs. Saves \$8.50 to \$9.50 on every car unloaded. It unloads from the car directly into a storage bin, from which the material is dropped onto the truck or wagon.

A car is unloaded in one hour to an hour and a half; trucks and wagons are loaded in

one to three minutes. The Fairfield Equipment replaces 20 to 30 men, handling from 30 to 40 tons of material per hour.

This equipment is easily erected, dismantled and moved from job to job. Not a nail required. Power furnished by $7\frac{1}{2}$ -H. P. Motor or 8-H. P. Kerosene Engine. The outfit complete as illustrated includes elevator, track feeder, bin and 8-H. P. Kerosene Engine, but may be purchased without bin or engine.

Write for complete specifications
and prices for immediate delivery.

THE FAIRFIELD ENGINEERING CO.
Lancaster, Ohio



FAIRFIELD
CONTRACTORS' MACHINERY



An Automatic Valve for Sewage Ejectors

An improvement to the well-known Shone pneumatic sewage ejector, manufactured by Yeomans Brothers Company, 1417 Dayton Street, Chicago, has been added in the form of an automatic valve which prevents the seepage in the ejector pit from rising above a certain point. The valve is very simple in construction and in operation, as it has no fine adjustments which would tend to prevent its successful performance. It is constructed with the same ruggedness as the other parts, which have been designed with the object of obtaining capacity for handling crude, unscreened sewage, combined with certainty of action, simplicity and durability, so that practically no attention need be given to the ejector for long periods of time.

These qualities have been attained in the Shone ejector, as the working parts are reduced to a minimum. The air acts directly upon the sewage, forming a frictionless air piston, so there can be no slip or leakage. Furthermore, the air is controlled by a pressure-operated, piston-type, bronze automatic valve, which makes only one movement each time the ejector fills and discharges its contents. This air valve is out of reach of the sewage, coming in contact with the air only, and has no fine adjustments, as springs or dia-

phragms. The actuating bells controlling this valve have a movement of only $1\frac{1}{2}$ inches, are constructed of cast iron and are open, therefore not subject to injuries common to the enclosed type of float.

A remarkable fact concerning this control equipment is the underlying principle governing the device, which has not been changed since its invention in 1886.

Specialist in Public Utility Rates

Walter A. Shaw, who for over seven years has been the engineering member of the Public Utilities Commission of Illinois, has recently returned to private practice as a consulting engineer, with offices at 30 North La Salle Street, Chicago, Ill. Mr. Shaw will give particular attention to public utility rate cases, public utility and industrial management and construction, and all branches of municipal engineering, operation and construction work, including designing and supervision.

An article by Mr. Shaw on "Establishing Rates for Service Rendered by Public Utilities by Contract" appears on page 574 of this issue.

A Portable Car-Unloader and Storage Bin

Every city official knows that the two factors which eat big holes in profits on any job are hand labor and trucks that are not moving. When it comes to unloading material from cars onto trucks or wagons, slow hand shoveling is bound to hold up the truck, and when there are cars to move and no trucks on hand, it means unloading onto the ground and rehandling the load onto trucks. Here again the waste is multiplied, because the ordinary expense of loading wagons and trucks from the ground by hand labor is greater than the original expense of unloading the material from the cars.

The Fairfield Engineering Company, Lancaster, Ohio, has recently placed on the market an economical, speedy method of unloading from hopper-bottom cars directly into an elevated bin, from which the material is dropped into the truck or wagon. No skilled labor is required to operate these machines, and they are strongly built and should operate for years with trifling up-keep. With one of these portable outfits one man can unload 30 to 40 tons in an hour to an hour and a half. His work, aside from starting and stopping the machine, is merely to keep the material falling freely through the car hopper to the feeder and to clean up and move the car. The machine really does the work of 20 to 30 men and makes possible a saving of \$8.50 to \$9.50 in labor on every 50-ton car unloaded, taking into consideration transportation and erection costs, 20 per cent depreciation on the equipment, and power costs.

The track feeder is so made as to require only a small excavation beneath the railroad track, making special railroad supports unnecessary. This is an important feature be-



THE SHONE SEWAGE EJECTOR WITH NEW CONTROL VALVE

To Maintain Your Parks



Especial attention must be devoted to the cutting of the grass. Adaptability, control, freedom from noise and breakdown; capacity and economy are important factors. The 4-ACRE Power Lawn Mower is satisfactory in theory and convincing in actual service.

JACOBSEN MANUFACTURING COMPANY

1303 FIFTEENTH ST.,

RACINE, WIS.

MUSHROOM TRAFFIC LIGHT



BRILLIANTLY LIGHTED AT NIGHT

NO UPKEEP COST

CAST STEEL

NO REPLACEMENTS

WRITE FOR BULLETIN

ELECTRICAL & SPECIALTY SUPPLY CO.

Madison Terminal Bldg., CHICAGO, I.L.



A PORTABLE UNLOADER AND STORAGE BIN BEING ERECTED

cause of the requirements of many railroads for special liability clauses in contracts for spur tracks where there are to be extensive excavations beneath any portion of them. The elevator is light-weight but amply strong, and sufficiently high to completely fill the loading bin. It is fitted with a two-wheel steel truck as part of its regular equipment, and a truck bracket to permit easy movement in connection with any wagon or motor truck. The bin holds 30 to 40 tons and can be filled within an hour by the elevator. Power is supplied by an 8-horse-power kerosene engine with friction

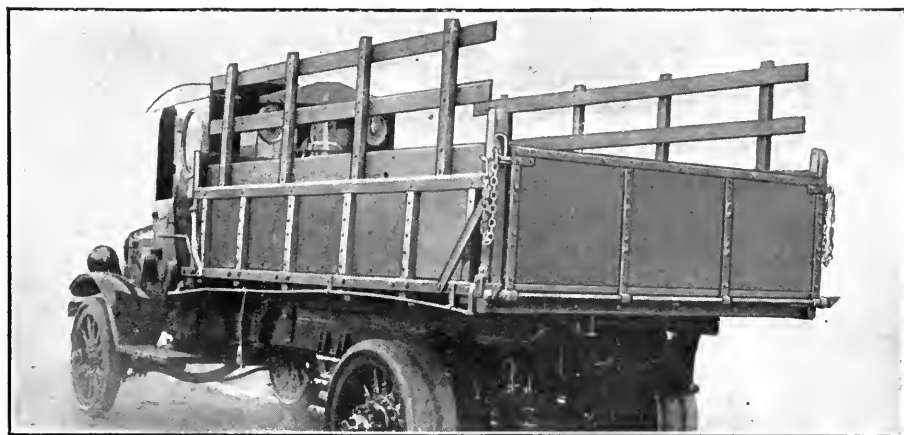
clutch and a steel roller transmission chain.

If the machinery is to be located permanently in one location where electric current is available, it is usually preferable for power, and a $7\frac{1}{2}$ -horse-power motor of proper specifications with reduction gears and mountings can be used.

The bins, as shown in the illustration, are specially designed for this outfit and are built in sections, enabling them to be readily loaded and moved on trucks or wagons, for a quick set-up at the new location.

Street Paint for Guiding Traffic

The front cover illustration of this issue of **THE AMERICAN CITY** shows a scene on Euclid Avenue, Cleveland, which clearly depicts the painted strips used to confine pedestrian traffic at crosswalks and to indicate the safety zone along the street car lines. The use of such indicators for the protection of pedestrians is becoming quite common in many cities. The Tropical Paint and Oil Company, Cleveland, Ohio, makes a specialty of a street-marking oil paint that penetrates the pores of concrete, wood block, asphalt, or any other type of pavement. It is claimed that it withstands the grueling wear of traffic longer than any other paint on the market. It is also used for zoning fire plugs in front of theaters, public places, municipal parking spaces, etc.



A COMBINATION STEEL-LINED BODY WITH SIDE BOARDS MANUFACTURED FOR GENERAL MUNICIPAL SERVICE BY THE ARCADIA TRAILER CORP., NEWARK, N. Y.

This Advertisement Will Not Interest You—

- if you are satisfied to see your city continue for the next twenty years along the same lines as it has the last twenty;
- or if you are satisfied with a Chamber of Commerce that periodically “comes to life” with a burst of enthusiasm, does a number of *little* things, and then goes off to sleep again, every few years;
- or if your Chamber of Commerce really has attained its full strength. There are comparatively few organizations of which this is true.

It Will Interest You

- if you believe your city has a possible future that is in every way far greater than its past;
- and if you would like to see your Chamber of Commerce become a dominating force in leading your city toward this future;
- and if it has not now attained this position.

There are hundreds of business men who had tried unsuccessfully for years to develop their full organized power for civic advance—and have finally succeeded with the aid of the American City Bureau. An “interview” has been arranged between you and a number of these men in pamphlet form. In this “interview”, these men answer a few direct questions you might like to ask them regarding their experiences. What they have to say is worth your attention, for their opinions are free from the prejudice you might expect us to have; and they speak from a definite knowledge of *facts*.

Why not send for the pamphlet?



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